LIBRARY
RECEIVED
MAR 24 1911
U. S. Department of Agriculture.

Price One Shilling Net,
or 25 Cents.

March, 1911.

THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

Editors for Great Britain and Ireland:—

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

GEO. H. WOOLDRIDGE, F.R.C.V.S., M.R.I.A.,
PROFESSOR OF HYGIENE, MATERIA MEDICA AND THERAPEUTICS IN THE ROYAL VETERINARY COLLEGE, LONDON.

Editor for Australasia:—

J. A. GILRUTH, D.V.Sc., M.R.C.V.S., F.R.S.E.,
DEAN OF THE VETERINARY FACULTY, UNIVERSITY OF MELBOURNE, AUSTRALIA.

Annual Subscription for the British Empire, 12s. Post Free; for the United States, $3.00.

LONDON.
BAILLIÈRE, TINDALL & COX,
8, HENRIETTA STREET, COVENT GARDEN.

AUSTRALIA AND NEW ZEALAND.
Messrs. GORDON & GOTCH, Ltd.,
Melbourne, Sydney, Wellington, &c.

NEW YORK:
W. R. JENKINS,
851 and 853, Sixth Avenue.

CHICAGO:
ALEXANDER EGER,
42, La Salle Street.

Entered as Second-Class Matter in the U.S. Post.

No. 429. VOL. 67.

Instruments

For the New Treatment of

ROARING . . .

As made for and used by Professor HOBDAY and other leading Members of the Profession.

Vide "VETERINARY JOURNAL," January, 1911.

Retractor.

Special Knife.

Operating Forceps.

Swabbing Forceps.

Prices on application to—

ARNOLD & SONS,

Veterinary Instrument Manufacturers,

6, Giltspur Street, West Smithfield, London, E.C.

Telegraphic Address:
"INSTRUMENTS, LONDON."

Telephone Numbers:
CITY 5240 (3 lines).
HOLBORN 518.

ceps.

c.

s).

CONTENTS.

PAGE

EDITORIAL—
The Litigious Client 129

GENERAL ARTICLES—
Fractures of the Hip Bone. By A. GOFTON, F.R.C.V.S. 131
Comparative Anatomy of Supernumerary Digits in certain Ungulates as evidence of the Inter-Relationship Existing Between the Various Species. By J. SHARE-JONES, M.Sc., F.R.C.V.S. 145
Rabies and its Control in India. By Captain E. CLIVE WEBB, F.R.C.V.S. ... 157
A Study of the Guttural Pouches of the Horse. By WALTER STAPLEY, M.D., M.R.C.V.S. 166

CLINICAL ARTICLES—
On Mr. Wallis Hoare's Article on Milk Fever. By R. FERGUSON STIRLING, M.R.C.V.S. 169
Tuberculosis of the Larynx in a Cow. By E. WALLIS HOARE, F.R.C.V.S. ... 171
Hæmaturia due to Sarcoma of Ovary and Kidney. By E. H. STENT, M.R.C.V.S. 173
A Cystic Condition of the Scrotum. By Captain E. S. GILLETT, M.R.C.V.S. 173
Fracture of the Odontoid Process in a Racehorse. By NORMAN MEYERS, L.V.Sc. 174
Hypertrophy and Dilatation of the Heart. By E. H. STENT, M.R.C.V.S. ... 175

CANINE AND FELINE CLINICALE—
Some of the Therapeutic Uses of Acetylsalicylic Acid in Canine Practice. By ARTHUR PAYNE, F.R.C.V.S. 176
Chylous Ascites in the Cat. By Messrs. SMYTHE and SMYTHE, M.R.C.V.S. .. 178
Hæmaturia caused by Papillomata. By E. H. STENT, M.R.C.V.S. 180

ABSTRACT AND REPORT—
Veterinary Science in Relation to Agriculture. By W. H. DALRYMPLE, M.R.C.V.S. 181
Veterinary Work in New Zealand 184

REVIEWS—
A Minute on Sheep Diseases. A Minute on the Cattle Disease. By R. WILLMOT, F.R.C.S. 186
The Register of Veterinary Surgeons, 1911... 189

MISCELLANEOUS—
Australasian Notes 189
Royal College of Veterinary Surgeons—Addresses Wanted 190

PERSONAL 190

TRANSLATIONS—
A Peculiar Case of Colic. By Staff Veterinary Surgeon BARTHEL 191
Nineteen Intestinal Stones in a Horse without Causing Colic. By Staff Veterinary Surgeon KLINGBERG 191

LETTERS AND COMMUNICATIONS, &c. 192

BOOKS AND PERIODICALS, &c., RECEIVED 192

JAMES SWIFT & SON,

OPTICAL AND SCIENTIFIC INSTRUMENT MANUFACTURERS,

Contractors to all Scientific Departments of H.M. Government.

7 Gold Medals awarded for Optical Excellence.

NEW "I.M.S." MICROSCOPE

(As supplied to the Army Veterinary Department, War Office).

For Bacteriology, with Specially Designed Mechanical Stage.

Complete with ⅔ in., ⅙ in., 1/12 in. N.A. 1·30 (Oil Immersion) Objectives, Focussing Abbe Condenser with Iris Diaphragm, Triple Nosepiece, and two Oculars, in Cabinet, **£23.**

Catalogue gratis on application.

UNIVERSITY OPTICAL WORKS,
81, TOTTENHAM COURT ROAD, LONDON W.

TRADE MARK.

SUPPLIED ONLY TO THE PROFESSION.

TUBERCULIN and MALLEIN.

In Hermetically-sealed Ampoules, containing about 4 cc., 9d. each.

Veterinary Tetanus Antitoxin ...	... 10 cc. 2/6; Dry form 3/-
Anti-Streptococcus Polyvalent Serum	... 10 cc. 2/6; Dry form 3/-
Canine Distemper	... 4 cc. 2/6

PASTEUR VACCINE CO.'S TUBERCULIN for Diagnosis of Tuberculosis,
PASTEUR VACCINE CO.'S MALLEIN for Diagnosis of Glanders,
ARE INSISTED UPON BY
Foreign and Colonial Governments importing BRITISH STOCK.

"BLACKLEGINE."

CORD FORM OF BLACKLEG VACCINE.

Single, 10 doses, 6/-; 20, 10/-; 50, 24/-.
Double, 10 doses, 8/-. Needle Outfit, 2/6; Ditto with Forceps, 3/-.

200,000 doses have been sold in the United Kingdom. The Easiest Method of Inoculation, and always ready for use.
We also furnish Anthrax and Blackleg Vaccine (powder form); Rat Virus, White Scour Serum, &c.

VERGOTININE

Pasteur Vaccine Co.

FOR BROKEN WINDED HORSES.

And Bronchitis Glandon, Persistent Cough, Chronic Catarrh, &c.

Prepared by A. VELPRY, Billancourt, Boulogne, S. Seine, France.

Cure guaranteed in one month. Thousands of recommendations. Write for full particulars.
Specially Reduced Price to Veterinary Surgeons, &c.

PASTEUR VACCINE COMPANY, LTD., LONDON, PARIS, &c.

C. H. HUISH & CO., Surgical Instrument Makers,
General Agents for Great Britain and Ireland,
12, RED LION SQUARE, LONDON, W.C.

Telegrams—PROSUM, LONDON.
Telephone—4639 Central.

All Veterinary Surgeons should regularly read

THE

VETERINARY NEWS.

2d.

The Cheapest, most Up-to-date and Popular weekly Veterinary Paper.

Under entirely new Editorial control.

10/6 PER ANNUM POST FREE.

THE
VETERINARY JOURNAL

MARCH, 1911.

Editorial.

THE LITIGIOUS CLIENT.

We have all met him or, more frequently, "her"! for unluckily it is more often than not the client of the female persuasion who most commonly enters the plaintiff box with thoughtless speed. Those who have had most to do with the law let the law severely alone, but a professional man is often, unfortunately, compelled to take proceedings in order to defend his professional honour. Two such cases have occurred within the past month, and in each instance the veterinary surgeon in the case has emerged triumphant and with his reputation unsullied. Full reports have already been given in the daily press and in the columns of our weekly contemporaries, so that one need not do more than briefly refer to them here, but each illustrates very forcibly the value of the National Veterinary Defence Society and the necessity with ourselves for acting up to our motto of "*Vis unita fortior.*" In the one case a young practitioner was sued by a lady who endeavoured to prove that she had caught mange from a dog which he had returned home from his infirmary as cured. She attempted to claim heavy damages in respect to the expenses she had incurred in being treated for a skin affection which she stated she had acquired from the dog, for sundry articles of clothing, &c., which had had to be destroyed, and also for the damage done to two other dogs which she asserted had caught mange from the animal after it had been sent home as cured. As the amount claimed was considerable the case had to be heard in the High Court, and eminent King's Counsel were briefed on either side. When, however, it was stated in cross-examination, in the evidence of her own medical attendant, that the "lady" had "human itch,"

or "scabies," and that the dogs had been previously treated by another well-known veterinary surgeon, off and on for a period of three years, for eczema, there was no alternative for the jury but to decide in favour of the defendant, and the case collapsed.

In the second instance a veterinary surgeon justly sued a client for fees owing for the treatment of a number of dogs, also the subjects of mange, and the client (a lady again) counter-claimed a much greater sum as the value of certain of the dogs who died of distemper whilst in hospital, endeavouring to prove that they had contracted the disease during their stay there, and that it was entirely through the improper, careless, and neglectful treatment of the professional attendant. In this contention she was supported by the officials of a well-known so-called philanthropic society, to whom the animal-loving public leave large legacies and to whom they subscribe enormous sums every year. Why this society interfered and tried to injure the reputation of this particular member of our profession is not quite clear, and why certain methods were adopted to obtain a conviction requires more explanation still. Luckily the evidence which was given was completely "cut up" in cross-examination and only reacted in favour of the side it was intended to crush. In each case the veterinarian had loyal help from his professional brethren (although the opposite side had no apparent difficulty in getting professional witnesses to give evidence, too), and there is no doubt that but for this the case would have "gone hard."

It seems somewhat astonishing upon reading the reports that any professional man could so readily be induced to give evidence against his brother practitioner when so serious a charge was brought, for had not both veterinary surgeons in these actions been men of substance and of good moral courage, the costs of the action alone would have meant something very serious, not to speak of the loss of professional reputation and *clientèle*. Certainly they are to be congratulated on the respective results obtained, and perhaps the latter may be a wholesome lesson to other clients who have desires and tendencies towards vexatious litigation.

It is a thing which every professional man is liable to, and all goes to prove the value of the establishment on a firm basis of a powerful central body with ample funds in hand to assist each of its individual members when occasion requires. The National

Veterinary Defence Society does good work in this direction, but might in many ways perhaps be made stronger, and the whole thing is certainly another point which shows the necessity of a voluntary or compulsory tax in order to place the Corporate Body of the Royal College itself on a safe and sound monetary basis. Should any expensive law case connected with the Royal College itself arise at the present moment, the Council would be powerless to act unless the individual members voluntarily submitted themselves to a tax or gave liberal donations. Our very existence would be threatened, and the sooner the new Bill becomes law the better for our safety.

General Articles.

FRACTURES OF THE HIP BONE.

By A. GOFTON, F.R.C.V.S.

Professor in the Royal Veterinary College, Edinburgh.

Fractures of the hip bone are of comparatively common occurrence in equines, probably following in order of frequency those of the tibia and the phalangeal bones. They must always be regarded as serious since they involve the largest bone of the body and one which has an important weight bearing function to perform; nevertheless, the position of the fractured bone, its thick, protective covering of muscles and its extremely small degree of natural mobility are all factors which are favourable to a satisfactory recovery and in few of the simple fractures met with in horses do the conditions lend themselves to treatment with a better prospect of success than in the majority of those of the hip bone. Deformity may and frequently does persist in varying degrees, but the working value of the animals is unimpaired in a considerable percentage of cases. This view may not be accepted without question; it is perhaps opposed to the opinion commonly held on the subject, but experience has shown that there are at least reasonable grounds for holding it.

In horses and cattle the external angle of the ilium is by far the most common site of fracture on account of its prominence and consequent exposure to injury as the result of falls or of rushing past fixed objects. The internal angle is very rarely fractured and the broad flattened portion still less frequently so;

but the shaft of the ilium above the acetabulum is a very common seat. Fracture of the acetabulum is far from uncommon, the line of fracture seldom bearing a relationship to the original lines of union of the ilium, ischium, and pubis. The ischium and pubis may be fractured into the obturator foramen separately or simultaneously, and less frequently they are fractured at the symphysis or close to it. Multiple fractures may be found *post mortem* as the result of severe violence, but sometimes a double fracture is met with in the absence of any history of specific injury.

Most hip fractures are due to violence in the shape of falls, collisions with fixed or moving objects, and crushing, but a proportion are the result of excessive or inco-ordinate muscular action. This is particularly the case with fractures of the ischium and pubis, the history very commonly associated with them and which in many instances does not permit of doubt, being that of sudden and unusually severe lameness during progression without apparent exciting cause other than a foot slipping from one paving-stone to another, or a slight stumble without a fall. Fractures of the shaft of the ilium and of the acetabulum sometimes occur in a similar manner, though doubt has been cast on the possibility of this happening as the result solely of muscular action. It is impossible to regard a fracture in either of these positions as the consequence of direct violence when it follows a slip of a foot on the paved stones of a street, or as has been stated by the owner, a stumble dependant on a knuckling of the fetlock or an apparent partial collapse of the limb. Excessive and probably inco-ordinate contraction of one or more of the powerful muscles attached to the hip bone, in an effort to overcome the effects of the slip or stumble, appears to be the only feasible explanation of the occurrence.

A primary fracture, by weakening the whole skeleton of the hip, may predispose to secondary fracture in other positions, the secondary fracture being commonly the result of excessive muscular action. The risk of secondary fracture is greatest when the pain and lameness associated with the primary one are mild, for animals are then liable to test the resistance of the bone to a greater extent than in its weakened condition it is able to stand.

Fractures through the ischio-pubic symphysis or through the ischium and pubis, near the symphysis, have occurred as a consequence of animals slipping and falling with the limbs "spread-

eagle." This is most liable to happen from pulling up sharply on soft, clayey, slippery ground, or as a consequence of animals throwing themselves about when in a delirious or semi-conscious condition, as sometimes occurs in milk fever in cattle.

The symptoms of fracture of the hip bone vary with its site. They are very pronounced in fracture of the shaft of the ilium and of the acetabulum, and, on the other hand, are often so mild in fracture of the pubis or ischium that they appear to be almost incompatible with such a serious lesion. Lameness is a feature of all fractures of the hip bone, commencing suddenly and being almost invariably severe in its earlier periods. When the shaft of the ilium, or more particularly, the acetabulum, is the site of the lesion, it amounts in many cases to complete inability to support weight on the limb and persists for weeks with a slow but gradual improvement. Multiple fractures exhibit a similar degree of inability. The external angle of the ilium and the tuber ischii, not being weight-supporting, the lameness associated with their fracture is very rarely so pronounced; usually it passes with the subsidence of the inflammatory reaction consequent on the effects of the violence responsible for the accident, though in an occasional case and particularly when the tuber ischii is involved, it may persist in a greatly-modified degree for an indefinite period.

The amount of lameness associated with fracture of the pubis or the ischium is variable. Most commonly it is very pronounced immediately after the accident, but it rapidly diminishes and within an hour or two the animal may be able to walk several miles and in a few days may be walking and trotting sound, even though crepitus may be heard at each step. The comparatively small amount of lameness within a few hours of the accident is such a common feature of these fractures that they are very liable to be overlooked in making an examination as its cause. It is of the highest importance to bear this point in mind, because of the extent to which these fractures reduce the resistance of the sound portions of the bone and the consequent greatly increased liability of the latter to give way if subjected to any unusual strain. Possibly the most common secondary fracture occurring in this manner is that of the shaft of the ilium, the primary one being a fracture of the pubis.

It has not been the experience of the writer to meet with secondary fracture in association with fracture of the ischium, but

in view of what is known to occur as a result of undiagnosed fracture of the pubis and the close similarity between the symptoms of the two conditions, the possibility of this happening is obvious.

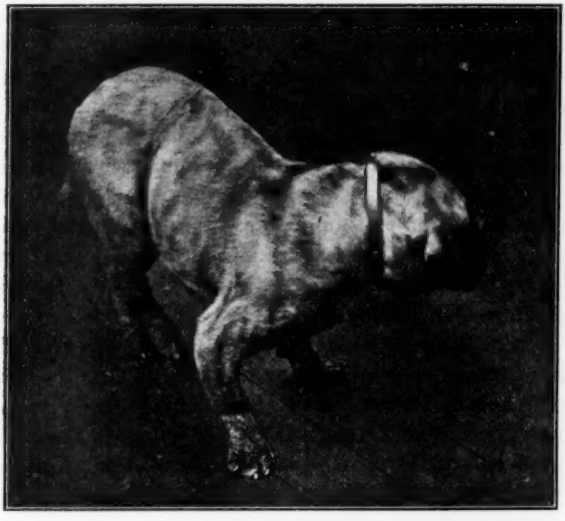
In the more severe lameness associated with hip fracture, horses and cattle may swing the limb and refuse to accept weight on it at all, but usually the foot is placed on the ground a little in advance of the sound one and with just sufficient firmness to ensure its being kept fixed. If forced to move, either no weight is accepted on the limb at all or the movement is practically a hop in order that a minimum of weight shall fall for the shortest possible period of time on the lame limb. There is always a great unwillingness to move and in carrying the leg forward the quarter is elevated and the limb advanced in a manner which reduces as much as possible movement of the hip joint. The foot is brought to rest a very short distance in front of the sound one.

When less pronounced it is seldom that the lameness presents characters sufficiently clear to permit of its definite location in the hip without the aid of local symptoms, but certain features may be observed which should lead to a careful and detailed examination of this region. The most noticeable are, that the forward portion of the stride is restricted, the foot being placed on the ground a short distance in advance of the sound one, the affected quarter is elevated in carrying it forward, the movements of the hind limbs are not in a line with those of the fore, the hindquarters being twisted round to the sound side, resulting in a movement which is difficult to describe except by saying that it presents a three-cornered appearance. Abnormal movements are naturally more accentuated and therefore more noticeable in the trot than in the walk, but they are not constant and none may be observed which attract attention to the hip region.

The position in which the limb is held in fracture of the acetabulum attracts attention as a rule. It is markedly adducted, the foot being placed in front of the sound one and not uncommonly resting upon it. The dog carries the limb in all hip fractures and the position of adduction is very noticeable in acetabulum fracture, the point of the hock of the lame limb being almost directly in front of the sound limb, and the foot not infrequently slightly to the outer side of it, a position, however,

which is common to other acute morbid conditions of the hip joint in the dog.

Fracture through the symphysis or parallel to it causes abduction of the limbs in movement, turning outwards and marked dragging of the toes with difficulty or inability in rising (Williams). Möller states that this fracture sometimes produces very slight disturbance and that the "body-weight is apt to break down the union between the sacrum and the ilium on the other side, or that the inner angle of the ilium may become fractured; the animals are then unable to stand and always die from decubitus."



Photograph illustrating the position of the limb in acetabulum fracture.

Crepitus is occasionally, though very rarely, a demonstrable feature in fracture of the external angle of the ilium. In all other fractures it is a constant symptom, though in the larger animals it is sometimes difficult to demonstrate by manipulation of the bone. When the tuber ischii is involved, forcibly drawing the limb forwards and manipulating the bony prominence may facilitate its detection. It is perhaps most easily demonstrated in fracture of the acetabulum, if the animal be lying, by applying moderate pressure over the great trochanter of the femur and manipulating the limb in a manner which will cause the head of

the femur to move within the cotyloid cavity, but it is necessary to differentiate between true crepitus and the "joint crepitus," which may be found in other morbid conditions of the hip joint and which are not uncommon in the dog. Crepitus will be most readily detected when the animal makes a natural movement of the limb; it is then, as a rule, both readily felt and heard, even though it may have been found impossible previously to demonstrate it on manipulation. Apart from natural movements, grasping the external angle of the ilium and the tuber ischii, and rocking the animal from side to side, affords the best means of detecting it.

A certain measure of displacement always occurs, the degree varying with the site of the fracture. It takes place immediately after fracture of the external angle of the ilium, the detached portion being pulled downwards by the contractions of the tensor fasciae latae, the internal and the external abdominal oblique muscles. The displacement is at a minimum when only a small fragment has been broken off, but usually it is sufficient to make subsequent bony union impossible. The action of the semi-tendinosus, semi-membranosus, and the biceps femoris muscles causes a downward and outward displacement of the tuber ischii when fractured.

In a very large proportion of cases the ilium undergoes obvious displacement, subsequent to a fracture of the shaft, the external angle being pulled downwards. If the fracture has been the result of considerable violence applied to the side of the hip, it may take place as an immediate effect of the force applied, but in simple fracture it is more common to find the displacement effected gradually as a consequence of muscular action and twelve to twenty-four hours may elapse before it is recognizable by external signs. A very similar displacement is associated with fracture of the acetabulum; it usually occurs some hours after the accident, but is invariably much less in degree and the amount of permanent deformity may be very slight. As a general rule, the amount of displacement is small in other simple fractures of the hip bone and there is seldom external evidence of it.

The resulting deformity naturally bears a definite relationship to the amount of displacement. From what has been said already, it is obvious that it will be greatest when a large piece of bone has been fractured off the external angle of the ilium

and that the deformity will consist of a flattening over the side of the quarter producing a noticeable disparity between the two hips. A somewhat similar deformity accompanies a fractured shaft of the ilium with displacement, but it differs from it in that there is a dropping of the quarter; the whole quarter shows a more rapid fall than the sound one from the internal to the external angle of the ilium, and except in very fat animals the latter can be felt intact on manipulation and the deformity recognized to be the result of a movement of the external angle, and not the consequence of fracture of a portion of it. The same remarks apply to deformity following fracture of the acetabulum, though it may be slight and easily overlooked. Multiple fractures produce a variable amount of deformity, depending on the extent and site of the fractures and in some degree on the effects of the violence responsible for the occurrence.

The deformity associated with fracture of the tuber ischii is, from its position, not very apparent. It takes the form of a flattening of the buttock at the side of the perinæum a little below the level of the anus, and is most readily recognized when viewed laterally on comparison with the sound side. An inflammatory swelling sometimes obscures the deformity for some days after the accident, and though of less frequent occurrence, the same holds good for fracture of the external angle of the ilium.

A symptom which, taken alone, possesses little diagnostic importance, but which is of considerable value in drawing attention to the seat of lameness in those fractures of the pubis and ischium in which the dependant lameness is not pronounced, is the appearance of a slightly-diffused œdematous swelling in the region of the scrotum (mammæ in the female) and the perinæum respectively.

The effects of a fracture are never confined to the bone alone, the surrounding soft structures always share to some degree in the injury, but in the majority of simple fractures this does not materially influence the results. The close proximity of large blood vessels or nerves, however, introduces possible serious complications, and these we sometimes find in association with fracture of the shaft of the ilium and of the pubis. In the former the terminals of the internal iliac artery and satellite veins bear a close relationship to the bone, and in displaced fractures

are sometimes ruptured with consequent fatal hæmorrhage. The veins, with their thinner walls, are naturally more easily ruptured, but both arteries and veins may be severed. Symptoms of severe internal hæmorrhage then quickly develop and death may take place within thirty minutes of the accident, though usually the process is slower and one to three hours may elapse before death supervenes. This discovery of a large swelling (hæmatoma) in the pelvis on rectal examination, coupled with the blanched mucous membranes and the other accompanying symptoms of hæmorrhage, permit of the recognition of this accident. It is to be observed that this unfortunate complication does not always occur coincidently with fracture of the shaft of the ilium. It is a risk inseparable from these fractures until the process of healing is sufficiently far advanced to ensure fixation of the fractured ends of the bone and may happen on the introduction of any cause liable to produce further displacement.

Similarly the obturator vessels and nerves may be injured where they lie in relation to the pubis in the course of their passage through the obturator foramen. Möller and Cadiot regard rupture of the obturator artery as the most common cause of fatal hæmorrhage in fracture of the pelvic bones. The obturator nerve may be divided by the fractured ends of the bone, or its function may be interfered with by pressure of the callus. In either case a rather striking symptom results. The obturator nerve supplies the following muscles: Gracilis, pectineus, adductor magnus, adductor parvus, and obturator externus, all of which are adductors of the limb, with the exception of the last named, which is an extensor of the hip. Since their nerve supply has been cut off they are paralysed; the action of the adductors is thus uncontrolled and as a consequence the limb is swung outwards in the act of moving it forwards during progression.

In fractures caused by severe crushing and accompanied by much displacement the fractured ends of the bone may penetrate the vagina or rectum, giving rise to hæmorrhage from these organs.

Occasionally in fracture of the external angle of the ilium, the soft tissues are severely injured without exposure of the bone and sinuses, or repeated abscess formation may follow. The detachment of small splinters of bone may lead to similar results.

Rational treatment readily remedies this condition, but neglect may lead to considerable burrowing of pus, which follows in some measure the direction of the fibres of the tensor fasciæ latæ, and a considerable quantity may collect in the loose tissue above the stifle joint, the overflow from which escapes by the original wound near the external angle of the ilium. This is not common, but may occasionally be met with in cattle.

In all the more severe fractures of the hip animals show some general disturbance. The expression is anxious and suggestive of acute pain, muscular tremors may be observed, especially of the muscles of the affected limb. There may be partial sweatings, the temperature commonly rises several degrees and there is some loss of appetite. These symptoms are best seen immediately after the accident, for they are transient and will, in a large measure, have passed off at the end of twenty-four hours.

It is seldom that much difficulty is experienced in diagnosing fracture of the external angle of the ilium or of the tuber ischii. The history of injury is usually available and the resulting deformity obvious. The detection of crepitus is the chief aid to diagnosis in other fractures, and when no deformity exists or results, definite diagnosis may depend almost solely on its demonstration. Valuable confirmatory evidence may be obtained by rectal or vaginal exploration, which permits of the examination of the pelvic surfaces of the pubis, ischium, and the lower part of the shaft of the ilium. The thin obturator internus and pyriformis muscles in part cover these pelvic surfaces, but swelling caused by fracture is recognizable through them. Rectal examination enables one to locate definitely the position of the fracture when these portions of the bone are the seat of injury, and it will also indicate the relationship which a fracture of the pubis bears to the obturator nerve, as it passed through the foramen of that name. Rupture of the blood vessels is indicated by a hæmatoma within the pelvis, recognizable on rectal examination.

Fractures of the pubis or ischium in which lameness is slight or absent are those in which the real nature of the injury is liable to be overlooked. In these, however, the detection of a scrotal or perineal swelling is, as already said, of value in locating the seat of lameness, though its absence must not be regarded as proof of the non-existence of fracture. Further examination and manipulation will usually result in the detection of crepitus, the diagnosis being confirmed by rectal exploration.

In the majority of simple hip fractures in the horse a favourable prognosis may be given, but in dealing with the larger domestic animals the economical side of the question must always be taken into consideration. Treatment may involve loss of work for a period as long as six months, depending on the site of fracture; but since the expense incurred in treatment consists almost solely of the cost of keep, it remains only to be decided whether the value of the animal and the chance of a useful recovery justify the expenditure. Every case of hip fracture will not make a useful recovery, but a sufficiently large percentage of those which are simple and uncomplicated do to justify treatment being recommended, provided the value of the animal makes it worth while. In cattle, slaughter is usually the best course from an economical point of view, except in the case of fracture of the external angle of the ilium or the tuber ischii. Young cattle sometimes make most unexpected recoveries from fractures, but it is impracticable to sling them and we are thus deprived of the chief measure at our disposal in the larger animals of obtaining some limitation of movement in the hip region.

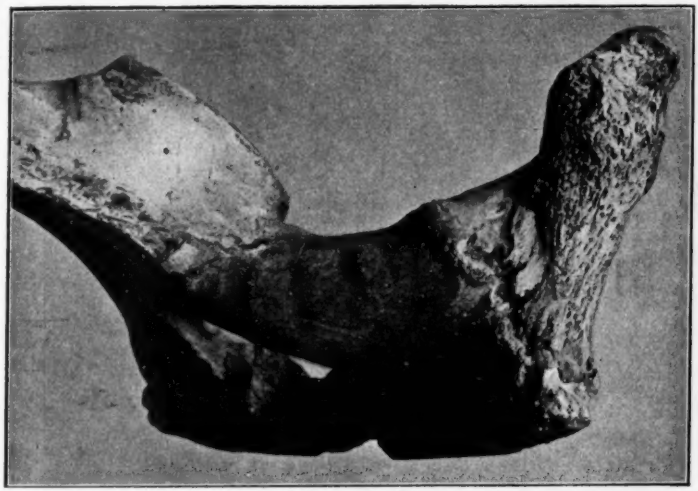
In the smaller animals (dog and cat) the cost of keep and treatment usually plays a secondary rôle and sentiment a primary one in deciding the course to be adopted. Whilst one may venture to promise good results in simple fractures, the owner must be warned that a long period of lameness may be expected and of the possibility of its remaining permanent when the acetabulum or the shaft of the ilium is implicated or the fracture involves more than one part of the bone.

Little doubt need be entertained of the result of treatment of fracture of the external angle of the ilium or of the tuber ischii. Lameness is, with very few exceptions, temporary, and one may safely venture to forecast recovery in from three to six weeks.

In other positions a longer period of rest is essential. As already said, fracture of the pubis predisposes to fracture of the shaft of the ilium by weakening the whole skeleton of the hip and sufficient time must be allowed to elapse to permit of a firm union before any strain is allowed to be thrown on to the injured bone. Similarly with fracture of the ischium. The minimum time which can be estimated with safety in working animals is

two months. No doubt under favourable circumstances a strong union may be effected in less time, but it must be borne in mind that only a small degree of pain is usually associated with these fractures, that the hip region cannot be immobilized in the larger animals and that in consequence of the almost continual movement of the limbs the conditions at the seat of fracture are not those most favourable to repair. This is evidenced by the fact that though repair eventually takes place crepitus may sometimes be recognized for two or three weeks after the receipt of the injury.

A period of three months should always be allowed after

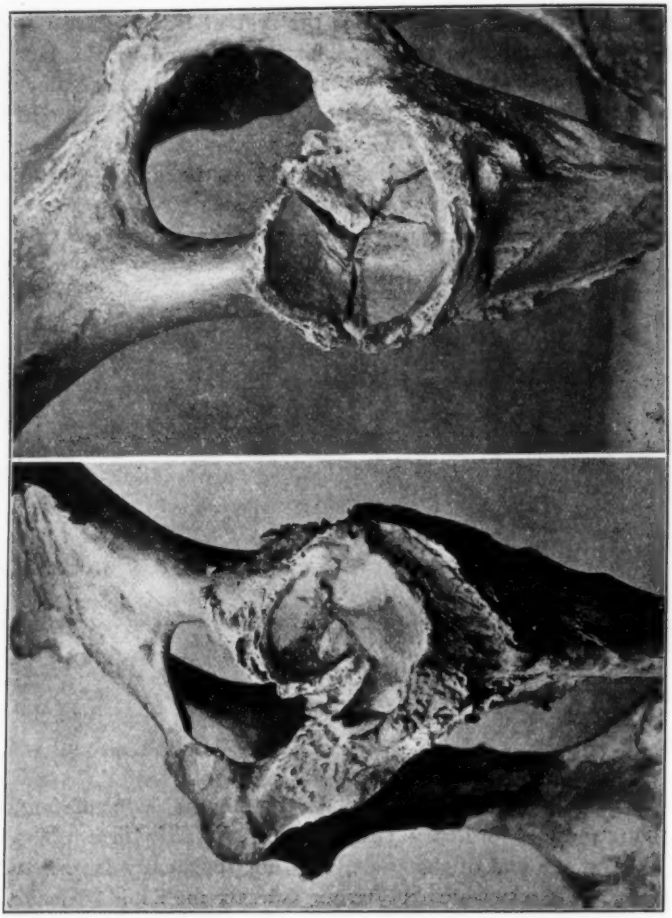


Displacement of the tuber ischii.

fracture of the shaft of the ilium. Two months is insufficient, for though under ordinary circumstances a fairly firm union may exist at the end of that time, it is not sufficiently strong to withstand the strain which the larger animals are liable to make on it. Refracture of the shaft of the ilium has occurred two months after the receipt of the original injury as the result of a horse playing when allowed his liberty in a loose box. At the end of two or three months animals are, as a rule, running sound; the muscles of the quarter are atrophied and considerable

deformity may exist, but the former is soon remedied by exercise and the latter does not interfere with the capacity for work.

Fractures of the acetabulum are usually regarded as hopeless, necessitating immediate slaughter, since it is expected that per-



Fractured acetabulum of carriage horse. Worked sound for eight years after recovery.

Fractured acetabulum of hunter. Worked sound for two years after recovery.

manent lameness will result, consequent on changes in the joint during the healing process, leading to interference with movement. These cases are not so hopeless as they may appear. Appended are two photographs of cases in illustration. The

first is the hip bone of a hunter mare, the second that of a carriage horse, which worked sound for two and eight years respectively after recovery. A period of three to six months is the time necessary to permit of a useful recovery and in most cases the longer period will be required.

When complications arise the aspect of the case is materially altered. Rupture of the larger blood vessels is followed by death. From a working point of view, obturator paralysis is nearly hopeless; it certainly is if the paralysis depends on division of the nerve, though if it be the result of callus pressure, restoration of function may take place as condensation of the callus and absorption of the inflammatory products around the fractured ends takes place. It will probably never be possible to determine during the life of an animal whether the paralysis is dependant on division of or pressure on the nerve, and the course decided on must largely depend on whether or not the owner feels justified, having regard to the value of the animal, in keeping him for a period of six months on the somewhat remote chance of having him eventually restored to usefulness.

Fractures through the symphysis heal badly on account of movement between the fractured bones and are regarded as incurable in the horse (Möller). Multiple fractures must be regarded as hopeless in the larger animals at least, the prospects of a useful recovery in the circumstances under which treatment has to be carried out are remote and slaughter is the most advisable and humane course. Slaughter should certainly be urged when the fracture has been caused by severe crushing and is accompanied by much displacement with laceration of the pelvic organs.

The possible influence of the callus on delivery of the young must be borne in mind in females, whom it is contemplated using for breeding. A large callus lessens the capacity of the pelvis and is a possible source of obstruction to delivery, but the definitive callus is not always a large one. Rectal examination will usually afford information on which an opinion may be based.

Pressure laminitis may develop in the sound foot as the result of constantly standing on it during treatment, introducing a troublesome complication and probably rendering an otherwise promising case hopeless on account of the pedal bone descending through the horny sole. This complication must be extremely

rare; it is infinitely more likely to develop in lameness arising from septic causes than it is from an aseptic condition such as exists in simple fracture.

Treatment of hip fractures may be summarized in one word—rest. Recovery may follow simple rest in a loose box, even in cases which appear far from promising; for example, the carriage horse, a photograph of whose hip bone is shown on page 142, received no other treatment than his liberty in a loose box for a period of about six months. If the best results are to be obtained however, horses should be slung in all fractures of the hip bone, with the exception of those in which the external angle of the ilium is involved, when slinging is unnecessary. It is difficult sometimes to convince an owner of the advisability of this course when the associated lameness is slight, as in fracture of the pubis or ischium, but it affords the only means practicable of ensuring the degree of stillness of the hip region requisite to a satisfactory and permanent union.

At the end of six to eight weeks most horses will be freely placing weight on the injured limb in the slings and gentle walking exercise may be commenced soon afterwards and gradually increased. It must not be ventured upon too early, however, and the animal should be replaced in slings until three months have elapsed. In fracture of the shaft of the ilium and the acetabulum blisters over the region, which are commonly recommended, are of no service in promoting recovery. Similarly in smaller animals, charges are of no practical value. Attempts to fix the hip by means of bandages in dogs are not satisfactory and rarely effect their purpose; nothing more is required than restricting the animal's liberty.

Simple treatment may be necessary to counteract the local inflammatory effects in fracture of the external angle, or the tuber ischii.

With reference to *post-mortem* examinations, it may be mentioned that in the event of death from rupture of the pelvic vessels, the hæmorrhage is extra-peritoneal and that the blood remains confined within the pelvis. In double fractures, such as those of the shaft of the ilium and of the pubis, it may be obvious that the former is of recent occurrence, whilst the edges of the bone in the latter are rounded and smooth from attrition, thus showing that it has been in existence for a period of time,

the duration of which can be approximately fixed by a shortly antecedent lameness of a slight and temporary character. When a history is available, a detached portion of the external angle of the ilium may be found in the connective tissue of the flank. The tuber ischii is seldom completely displaced from the body of the bone, osseous union usually takes place to a considerable extent producing an appearance as though the prominence had been bent downwards and outwards from the body of the bone.

COMPARATIVE ANATOMY OF SUPERNUMERARY DIGITS IN CERTAIN UNGULATES AS EVIDENCE OF THE INTER-RELATIONSHIP EXISTING BETWEEN THE VARIOUS SPECIES.

By J. SHARE-JONES, M.Sc., F.R.C.V.S.
School of Zoology, University of Liverpool.

First Article.

Cases of supernumerary digits, particularly in the domestic members of the ungulata, have frequently been recorded. Unfortunately such cases have been divested of much interest inasmuch as the published records have usually not included a dissection of the specimen so that no attempt has been made to bring out those morphological characters of interest to the comparative anatomist; and the only value attached to such records is that they are announcements of what are regarded in general in the light of monstrosities.

There is very little literature available on the subject.

In 1906 Warren* published a "Note on the abnormal hoofs of a sheep." Dupas† in 1905 reported a peculiar case in the horse. Arising out of the discussion on this case, Lesbre‡ published in 1906 an interesting article on "Supernumerary Digits in Solipeds," with a number of illustrations, the purport of which was to endeavour to classify them according to the theory of their origin. He separated those in which the digit appeared simply to split into two parts in the median sagittal plane and termed them Schistodactyles, stating that these were the most

* Warren, Arnold. *Ann. Natal Govern. Mus.*, Vol. i., pp. 109-110.

† Dupas, Leon. "Note sur un cas curieux et rare de didactylie chez le cheval." *Rec. Méd. Vétér.*, Paris, T. 82, pp. 563-566.

‡ Lesbre, F. X. "Note sur la polydactylie des solipedes. *Rec. Méd. Vétér.*, Paris, T. 83, pp. 78-84.

rare, and that they varied from "the simple bifurcation of the nail or phalanx up to complete division of the digit."

The writer* described in 1902 a peculiar case of supernumerary digit in the ox, which will be included in this series.

So far as can be ascertained, no attempt has hitherto been made to compare the anatomy of these abnormal digits in the various species.

A detailed examination of a selected number of such specimens in the horse, ox, and pig has revealed to the writer many points of interest as showing the inter-relationship existing between these different species of the order, and these are given in the following accounts in which more particular note is made of the bones, tendons, and ligaments.

For the convenience of reference, the specimens will be numbered.

CASE I.

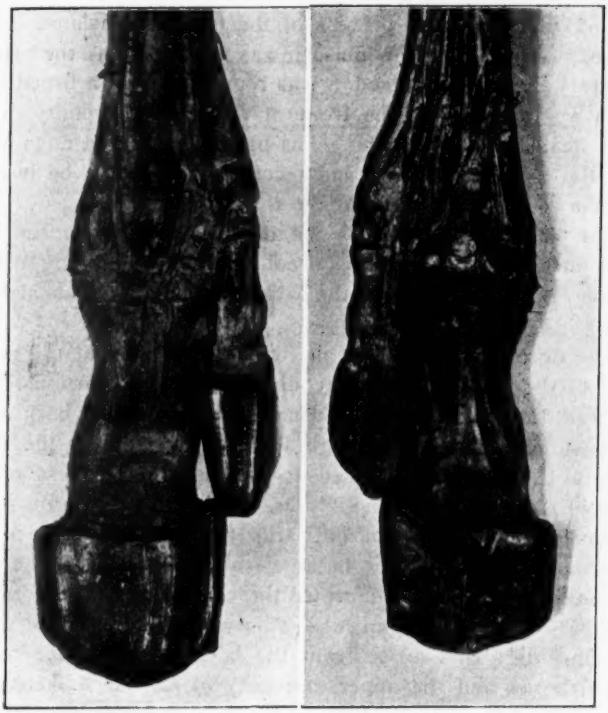
This specimen might be regarded as typical of those cases which are most frequently encountered—namely, those in which the supernumerary digit does not show a high degree of organization and is more or less a deformity.

It is the left manus of a foal presenting an internal supernumerary digit, which is very small as compared with the principal digit (Fig. I.), the toe of the hoof only extending to the coronet of the latter. A superficial examination of the specimen revealed no abnormality until the middle third of the metacarpal region was reached, when it could be detected that the inner small metacarpal bone broadened out inferiorly and did not terminate in the enlargement which is commonly designated as the button. The metacarpo-phalangeal joint was broader than usual, but the skin did not divide until the proximal epiphysis of the first phalanx of the digit was reached. In consequence, only that portion of the supernumerary digit, extending from the distal extremity of its first phalanx to the hoof, was enveloped in a separate fold of the integument. Externally the hoof did not present the usual conformation of that of the horse, but was more compressed from side to side, was convex externally, and concave on its inner surface, so that it bore a close resemblance to the hoof of the ox. On its inferior surface it presented a

* Share-Jones. A Case of Supernumerary Digit in the Ox. *Journal of Comparative Pathology*, Vol. xv., p. 143-146.

curved slit, the convexity of which was directed outwards. There was no trace of a frog. The whole of the exterior of the wall was covered by a layer of periople characteristic of the young unshod hoof.

The Tendons.—The tendon of the external extensor (extensor suffraginis) was well developed and was attached to the proximal



CASE I.

FIG. I. A. FIG. I. B.

Photographs of specimen in Case I. (skin removed). A, anterior aspect. B, Posterior aspect.

extremity of the anterior face of the first phalanx, slightly to the outer side of the middle line.

The tendon of the anterior extensor of the digit (extensor pedis) took the usual course down the front of the large metacarpal bone, but did not detach any branch of communication

to the external extensor. On the lower epiphysis of the large metacarpal bone it gave off a branch which passed directly outwards and blended with the origin of the anterior extensor tendon of the supernumerary digit in this manner, resembling the corresponding tendon in the ox. At the middle third of the first phalanx the tendon broadened out where it received the two divisions of the suspensory ligament and its ultimate insertion was into the pyramidal process of the terminal phalanx.

No anterior extensor muscle was present on the supernumerary digit, but its tendon was represented by a broad band which was attached to the front of the distal extremity of the inner small metacarpal bone. The band then passed downwards over the front of the first and second phalanges to be inserted into the pyramidal process of the third phalanx.

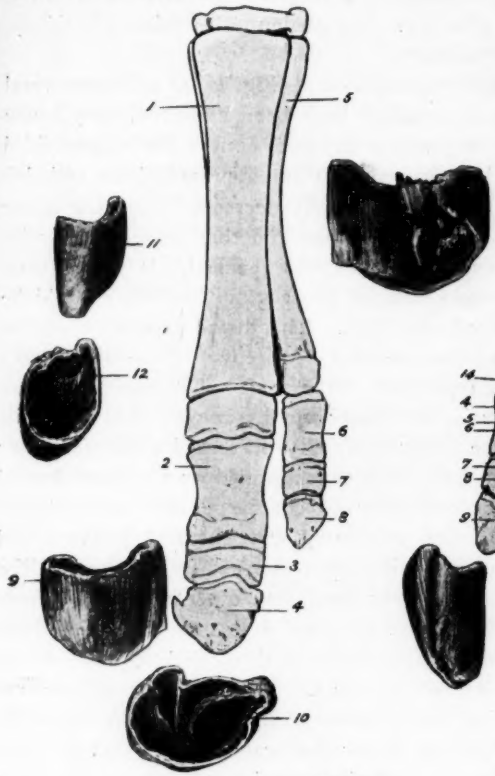
The superficial flexor of the digit (flexor perforatus) was quite normal and formed the usual ring for the passage of the tendon of the deep flexor at the back of the metacarpo-phalangeal joint.

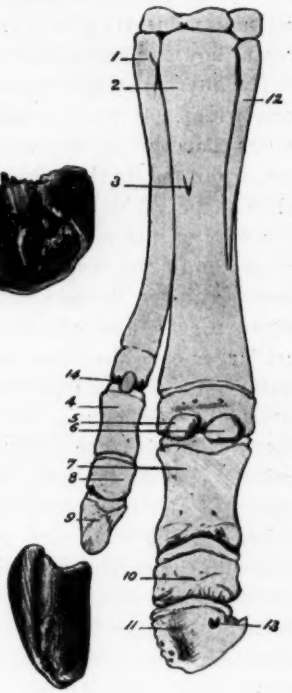
The deep flexor of the digit (flexor perforans) at the middle third of the metacarpal region divided into two portions. One of these, the larger, took the usual course down the back of the principal digit, passed through the ring formed by the flexor perforatus, and was attached to the semi-lunar crest on the third phalanx. The other division, which was cordiform, passed obliquely downwards and outwards to reach the back of the supernumerary digit and became inserted into its terminal phalanx. Of this digit it formed the solitary flexor.

The Suspensory Ligament.—This was well developed on the principal digit and arose from the back of the lower row of carpal bones and the upper extremity of the large metacarpal. Above the fetlock it divided and the two divisions passed round to the front of the limb, one on either side the joint, each giving off a slip of insertion to the corresponding sesamoid bone. They joined the anterior extensor tendon on the front of the digit.

On the accessory digit this ligament was simply represented by a fibrous band which was attached superiorly to the inner small metacarpal bone on its inner surface, just below the head. Towards the lower extremity of the bone the ligament became much more expanded and was finally attached to the posterior surface of the sesamoid bone at the back of the metacarpo-phalangeal joint

The vessels and nerves were very rudimentary. The digit was supplied by branches of the large metacarpal artery and internal plantar nerve, which were detached from the parent structures at the middle third of the metacarpus. Passing on to the supernumerary digit, each divided into two small branches, which ran down, one on either side, and were ultimately lost near the second inter-phalangeal joint.





CASE I.

FIG. II. FIG. III.

FIG. II.—Bones and hoofs of Case 1 (anterior aspect). 1, large metacarpal bone; 2, 3 and 4, phalanges of principal digit; 5, inner small metacarpal bone; 6, 7 and 8, phalanges of supernumerary digit; 9, hoof of principal digit; 10, interior of same; 11, hoof of supernumerary digit; 12, interior of same.

FIG. III.—Bones and hoofs of Case 1 (posterior aspect). 1, internal small metacarpal; 2, large metacarpal; 3, nutrient foramen; 4, 8 and 9, phalanges of supernumerary digit; 5 and 6, sesamoid bones of principal digit; 7, 10 and 11, phalanges of principal digit; 13, plantar foramen on terminal phalanx; 14, sesamoid bone of supernumerary digit.

The Bones.—The large metacarpal bone (Fig. II, 1) presented postero-internally throughout the whole length of its diaphysis a roughened area for the attachment of the interosseous ligament uniting it to the inner small metacarpal. This area was narrowest at the middle third and gradually became broader upwards and downwards as it approached the epiphyses. The distal extremity of the bone presented inwardly a facet for articulation with the first supernumerary phalanx. The phalanges of this digit did not present any notable feature.

The internal small metacarpal bone (Fig. II. 5) showed several peculiarities. It was, as might have been expected, very much longer than the corresponding external bone. The upper third was larger and its shaft was rod-like and approached the cylindrical in shape. The diameter gradually decreased from the upper extremity to the middle of the bone and then progressively increased until the distal epiphysis was reached. It has already been mentioned that no nodular process or "button" could be felt in the undissected specimen. The distal extremity was in fact larger even than the proximal. Moreover, it ossified from a centre quite distinct from that of the shaft. The line of division between the diaphysis and lower epiphysis was still very distinctly marked. The lower extremity presented a flat facet for articulation with the facet already mentioned on the inner lateral aspect of the lower extremity of the large metacarpal bone. Inferiorly, the bone was articulated with the first phalanx and also with the single sesamoid bone possessed by this digit. The last-mentioned bone was very small and differed in shape from those of the large digit (Fig. III. 14). It was not of the regularly three-sided pyramidal shape, but was elongated from above to below, and resembled that of the ox. Its posterior surface was curved in the vertical and transverse directions. Over this surface the branch from the flexor perforans tendon played. The tendon being spread out over the bone helped to keep the latter in position.

The first phalanx (Fig. II. 6) presented marked differences from the corresponding bone in the fully-developed digit. It was very much compressed from side to side and in general appearance was not unlike one half a normal bone sawn through vertically. Its inferior extremity showed two small articular convexities separated by a shallow antero-posterior groove, also

articular. There was no trace of the V-shaped roughened area which forms such a distinctive feature of the posterior surface of the normal bone. The second and third phalanges (Fig. II. 7 and 8) also bore a general resemblance to one half the corresponding bone in the mature digit. The lower face of the terminal phalanx was flattened and presented a tiny foramen, which evidently corresponded to the plantar foramen of the fully-developd bone.

On the principal digit there were two sesamoid bones (Fig. III. 5 and 6). The outer was the larger. In shape it approached the pyramidal. The inner was irregular.

The second and third phalanges of this digit presented a normal appearance and call for no remark.

The terminal phalanx (Figs. II. 4 and III. 11) was peculiar. On examining the exterior of the hoof of this digit, it was observed that the anterior aspect of the wall presented a deep vertical grove towards the inner side (Fig. II. 9), giving the hoof an appearance which suggested that an attempt was being made to cut off a portion.

The reason for this became apparent when examining the terminal phalanx, for the bone presented an asymmetrical appearance, the outer portion being very much better developed than the inner. The latter was devoid of both basilar and retrossal processes. The inferior surface of the bone was slightly concave, and was not divided into solar and tendinous areas, since the semi-lunar crest was absent. Moreover, there was only one plantar foramen (Fig. III. 13). This was the outer and was abnormally large. The place of the internal plantar foramen appeared to be taken by a small aperture which was found midway between the heel and toe on the inner border of the bone.

CASE II.

This is the left manus of a foal, the extremity of which is bifid. It represents a typical member of the Schistodactyles of Lesbre.

There was nothing abnormal about the external appearance of the metacarpal region and the fetlock presented the usual appearance, but there were two separate hoofs and the digits were separated up to the first inter-phalangeal joint, the slit between the two folds of the integument extending to the inferior third of the first phalanx.

The Tendons.—Upon removing the skin (Fig. IV.) it was found that the tendon of the external or lateral extensor was attached to the antero-external aspect of the superior extremity of the first phalanx. The anterior extensor tendon divided into two portions in front of the metacarpo-phalangeal joint. The two divisions were of equal size and each passed down the limb

CASE II.

FIG. IV.—Photograph of the anterior aspect of the specimen after removal of the skin.

to be inserted into a roughened elevation in the position of the pyramidal process of the terminal phalanx.

There was a similar division of the superficial and deep flexor tendons. The division of the superficial flexor was less complete than was that of the deep. The two fibrous tubes formed

for the passage of the latter were distinct from one another only in their inferior half, and superiorly were firmly united.

On the proximal extremities of the second phalanges very rudimentary complementary cartilages were present and the divisions of the superficial flexor tendon were attached to these bodies. The divisions of the deep flexor tendon (flexor perforans) were inserted into rough areas on the inferior aspect of the terminal phalanges.

The Ligaments.—The suspensory ligament took origin from the lower row of carpal bones and the upper extremities of the metacarpals. Running down the channel formed posteriorly between the large and small metacarpal bones, it divided just above the metacarpo-phalangeal articulation into two portions. These ran round to the front of the limb, each, whilst so doing, giving off a slip of insertion to the corresponding sesamoid bone. Each division ultimately joined the corresponding branch of the tendon of the anterior extensor of the digits.

The inferior sesamoidean ligament had a most peculiar arrangement. What corresponded with the superficial division was a vertical band, which, in its inferior third, was slit, the two portions being inserted one into each of the rudimentary complementary cartilages respectively. The middle division did not possess a vertical portion, but there were present two powerful strands which converged to meet inferiorly at their insertion into the posterior surface of the first phalanx. They were, however, very much shorter than the corresponding strands ordinarily found. No crossed bundles corresponding to the deep division were discovered, but there were present two powerful vertical strands. Each descended from the base of one of the sesamoid bones and was attached inferiorly to the corresponding division of the distal extremity of the first phalanx on its posterior aspect and immediately above the articular surface. This ligament thus bore a resemblance to that of the ruminant.

The Bones.—The large metacarpal bone (Fig. V. A, 2) presented the usual features. It was, however, somewhat more expanded at its superior extremity and its shaft relatively narrower and more cylindrical, in this respect resembling a large metatarsal bone.

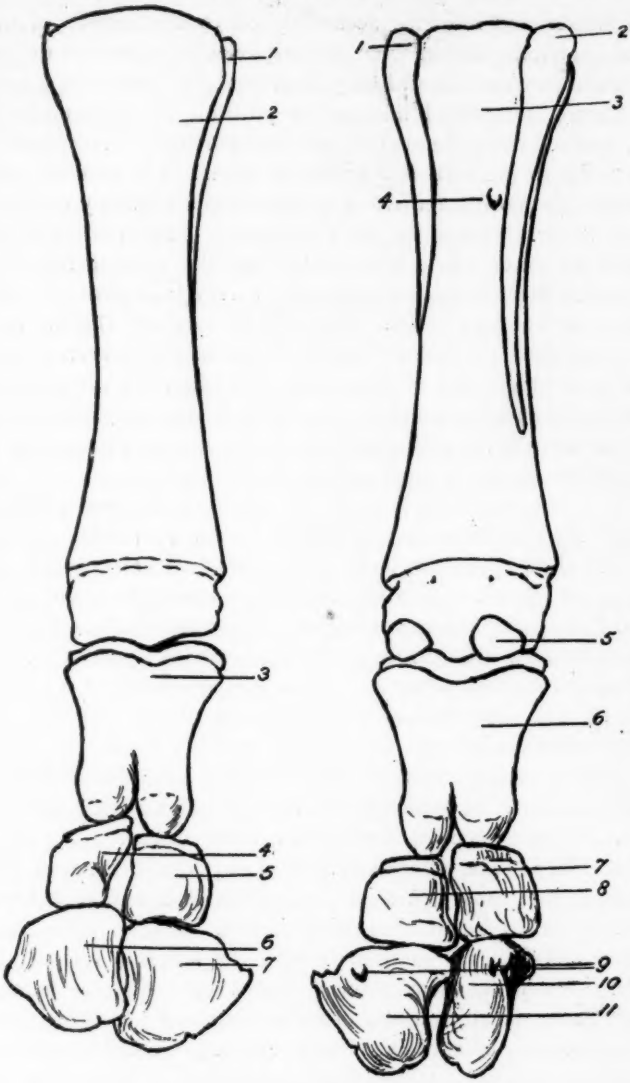
The inner splint bone (small metacarpal) was about an inch longer than the outer. Each terminated inferiorly in a small but well-defined nodular "button." The bodies were distinctly rod-

like and tapered very gradually towards the buttons and the edges were rounded off.

Two sesamoid bones were present (Fig. V.. B, 5). These in shape approached a three-sided pyramid, but their external surfaces were markedly convex and did not show a roughened pit for the attachment of the lateral sesamoidean and superior sesamoidean ligaments. There were no peculiarities in the upper half of the first phalanx. Its lower half, however, was extremely small and compressed from side to side. A vertical mesial fissure extended up the shaft from the inferior surface, dividing the lower third into two symmetrical portions. Each of these was in the form of a rod, which was compressed laterally. The inner rod was slightly thicker than the outer. Each rod presented inferiorly a surface convex in all directions, which was smooth and articulated to the superior surface of the corresponding second phalanx.

The Second Phalanges (Fig. V. A, 4 and 5, B, 7 and 8).—There were two of these. Each was of a most extraordinary size and shape and appeared too large, and ill-adapted to be carried by the corresponding portion of the first phalanx. The superior surface was smooth and presented a shallow cup-like facet for articulation with the first phalanx. The inferior surface was much more extensive and undulating. It presented a very slight depression in the place of the well-marked antero-posterior groove usually found. It was smooth for articulation with the terminal phalanx and the area for articulation encroached to a considerable degree upon the posterior surface of the bone, but this encroaching portion was undivided and no notch was present. The anterior surface was slightly convex, the external surface markedly so. These surfaces blended with each other since the antero-external border was rounded off. The antero-internal border was sharper and better defined. In its length it was curved with the concavity directed inwards. The posterior surface was relatively more extensive than the corresponding surface in an ordinary second phalanx. It was concave in the transverse direction.

The Terminal Phalanges (Fig. V., A, 6 and 7).—At first glance each appeared not unlike one-half the ordinary terminal phalanx, but a closer examination revealed a striking similarity to the corresponding phalanx in the ox. The superior surface



CASE II.

FIG. V. A. FIG. V. B.

FIG. V. A.—*Anterior aspect.* 1, small metacarpal; 2, large metacarpal; 3, first phalanx; 4 and 5, second phalanges; 6 and 7, third phalanges.

FIG. V. B.—*Posterior aspect.* 1 and 2, small metacarpals; 3, large metacarpal; 4, nutrient foramen; 5, sesamoid bone; 6, first phalanx; 7 and 8, second phalanges; 9, plantar foramina; 10 and 11, terminal phalanges.

was articular and moulded accurately on to the surface of the second phalanx. The inferior surface, relatively much more extensive than that of the ordinary third phalanx, presented a very faint curved roughened line in the position of the semi-lunar crest, which divided the surface into two portions, corresponding respectively to the solar and tendinous areas. The anterior area was much the more extensive, was smooth and distinctly concave. The posterior area was flat but roughened. This area presented towards its outer end a well-marked circular plantar foramen, from which there extended backwards a very faint groove. The anterior surface was convex from side to side and slightly concave from above to below. In its lower half this surface presented a large number of very small foramina. One was much larger than the others and corresponded to the preplantar foramen. From it there was a faint trace of a groove running backwards to the posterior angle of the bone.

The antero-superior border was in the form of a convex ridge, so that the elevation corresponding to the pyramidal process extended right across the bone. There was no depression in the position of the pit into which the antero-lateral ligament is inserted. The inferior edge was sharp and sinuous. It terminated posteriorly in a backwardly-projecting piece of bone—a poorly-developed retrossal process. There was no trace of a basilar process. The inner border was sharp and curved with the concavity directed inwards. The postero-superior border was thick and rounded in the transverse direction, and longitudinally it was almost straight. It presented no facet for articulation with the navicular bone, since this bone was entirely absent.

The Hoof.—The anterior and outer surfaces of the wall were convex in the transverse direction and blended with each other. From above to below they were almost straight. The inner surface was flat and continuous with the anterior surface, the border separating them being rounded off. On the inferior aspect there was an irregular distorted structure which resembled half a frog twisted spirally. Posteriorly it presented an enlargement corresponding to one of the frog bulbs. The apex of this structure extended quite close to the anterior border of the hoof, so that the area corresponding to the sole was extremely small. In the interior of the hoof was a deep cutigeral groove and below this the horny laminæ were both numerous and quite regular.

Inferiorly there were two prominent horny ridges with sharp edges. The ridges met anteriorly, but posteriorly were widely separated. Their edges were very sharp. There was no trace of a frog stay.

RABIES AND ITS CONTROL IN INDIA.

By Captain E. CLIVE WEBB, F.R.C.V.S.
Army Veterinary Corps, Aldershot.

Indexed 3. A. I.

(*Continued from p.* 105.)

Protective Inoculation.

Pasteur introduced a method of protective inoculation, although it is seldom used except in the case of people who have already been bitten by a rabid animal or animal suspected of rabies, and are therefore already infected. Hence its use is more in the nature of a curative.

The material used as a vaccine is the spinal cord of a rabbit that has been inoculated with what is called the fixed virus of rabies. This fixed virus is an intensified virus and is obtained by the method of passage through a number of generations of rabbits. The period of incubation in rabbits inoculated with the ordinary virus of rabies from a natural case of the disease is fourteen to fifteen days. The fixed or intensified virus has an almost constant period of incubation of six or seven days.

After removal of the cord from the rabbit dead of rabies it is partially desiccated by being suspended in a jar over some fragments of caustic potash at a temperature of about 23° C.

A cord of fourteen days' desiccation becomes innocuous, and cords exposed for shorter periods are graded in their virulence.

The system of vaccination is as follows:—For the first two days emulsions of cords of low virulence are inoculated, commencing with cords of fourteen and thirteen days' desiccation and following on the second day with cords of twelve and eleven days' desiccation. The virulence of the cords employed is rapidly worked up, until at the end of the first week a cord of only three days' desiccation may be used. During the second and third weeks of treatment changes are rung on cords of between three and five days' desiccation.

The treatment may, of course, be modified according to the

severity of the bites sustained. The explanation of the efficacy of the vaccination used on patients presumably already affected with rabies is that owing to the virus employed being the fixed virus and having a shorter period of incubation than the ordinary virus in a natural case of rabies, the person inoculated is rendered immune before the infection by the natural virus is able to secure a footing.

Control of Rabies in India.

This sub-heading would be more correct were it worded "Want of Control of Rabies in India." The state of things as at present exists can only be described as lamentable. Year after year a large number of people, both European and native, make the journey to the Pasteur Institute at Kasauli for antirabic treatment, owing to their having been bitten or licked on an abrasion by rabid dogs or dogs suspected of rabies. Nor does this very large number who present themselves at the Institute for treatment represent anything approaching the actual number of human beings who have sustained bites by actually rabid or suspected dogs in any one year, since a very great number of people, and especially natives, will not undertake the journey either from prejudice against the treatment or on account of the expense and discomfort involved.

From this it will be seen that, owing to the entire absence of any adequate measures for the suppression of the disease or for its control, the inhabitants of India are rendered liable to the danger of inoculation, which danger might be minimized a thousandfold were practical and energetic measures adopted by Government. In speaking of the disease, it must be borne in mind that I refer to the disease in dogs, which species, from a practical point of view, is the only one which can be taken into consideration.

In any measures which Government might think fit to adopt, not the least important is the education of the lay public in the recognition of the disease and the immediate steps to be taken in the event of the occurrence of a case.

The risk of infection to human beings is increased a thousandfold not only by the painful ignorance on the part of the lay public, both European and native, with regard to the recognition of suspicious symptoms, but also by what in many instances

amounts to culpable negligence, especially on the part of owners of dogs.

I was particularly struck by an editorial article which appeared in the *Journal of Comparative Pathology and Technology*, vol. viii., 1895, as illustrating the ignorance of the lay public at that time, and also the grievous havoc that may result therefrom. Similar cases have come under my notice in India. The article above referred to gave the following case: A man who lived at Croydon was bitten by his own dog, the attack being quite unprovoked. The dog was afterwards taken to a Miss Jeffries and chained up, though apparently not under suspicion of rabies. It escaped and bit a little girl on the hand, and afterwards returned to its own home and bit a boy in the leg. At this stage a veterinary surgeon was called in and recognized the case as one of rabies and had the animal destroyed. The owner refused to believe that such was the case and refused to proceed to Paris for treatment. The case was afterwards confirmed, but even then the owner could not be persuaded to undergo Pasteurian treatment, and as a result succumbed to hydrophobia.

In this case it will be seen that ignorance was not only the cause of death of the offender, but also endangered the lives of two children. Other cases I have known in India where an owner of a dog has been warned of the suspicious nature of his dog's demeanour and has still neglected to either have the dog destroyed or to take proper steps to secure the animal against any possibility of its breaking away. What is the result in such a case? The dog, whose demeanour perhaps had only been one of apparent sulkiness and passive resistance, suddenly becomes frantically rabid, breaks away, and in its mad career probably bites many other dogs, and possibly human beings, before it is ultimately destroyed. Such cases as these can only be classified as culpable negligence. It is in this way that the disease is fostered and widely spread, and such cases are only too common. I am strongly of the opinion that legislation is necessary in this direction to prevent such cases of glaring criminal negligence and to bring home to the perpetrators the enormity of their offence by the imposition of a heavy fine. No man is justified in endangering the life of a fellow-creature, and yet such is done thoughtlessly and only too frequently.

If an owner is warned that his dog is under the slightest

suspicion of being rabid, then there are only two courses open: either the dog should be destroyed immediately, or, if he doubts the correctness of the diagnosis, it is incumbent on him to take every precaution as if the dog were rabid. Such precautions involve the proper segregation of the patient so as to render any possible contact with man or beast outside the range of possibility. To merely chain a dog up does not meet the case. It should not only be strongly secured by a chain and collar to a staple or other suitable object, but should also be kept within four walls, and the key of the door giving entrance to such a place should remain in the owner's possession. If the symptoms shown by such a dog were those of rabies, any doubt will be removed within ten days.

It is also my very strong opinion that an owner is not justified in getting any attendant, whether native or European, to look after and feed such a dog without fully explaining the nature of the case and putting the worst possible complexion on the danger which he is running. Owners are too apt to allow a native "sweeper" to attend a dog under suspicion without adopting this course or even minimizing the danger and pooh-poohing the idea of the dog being "poggle."

Further Reasons why the Disease in India Remains Unsuppressed.

I have already stated that as far as I am aware no steps are taken by Government for the suppression of rabies. A rabid dog may go through a town or cantonment and bite a dozen or more other dogs. The owners of these latter may get advice as to the measures which they should adopt in the case of these bitten dogs, but if they were informed that the only safe measure was to strictly segregate for six months the majority would fail to carry out such a precaution where there is no compulsion, owing to the trouble it would involve. In support of what I say, and also as illustrating the general ignorance of the lay public as to the necessary measures to be taken, I give the following instance:—

I was making a trip last year through the hills from Murree to Abbottabad. During the first day's march we halted for lunch outside a certain military hill station and picnicked close to the main road. During lunch a rabid dog came galloping along the

road, hunted by several officers on ponies. Some time afterwards I met one of the officers who was in the hunt after this same rabid dog and questioned him about it. He informed me that this dog had bitten about fourteen other dogs in that one morning. Asked as to what steps were taken in the case of the dogs which had been bitten, he replied that the owners of the latter had been told to keep them tied up for ten days, and if they were all right at the end of that time they could be let loose!

Whoever was responsible for this advice was evidently a little at sea as to the period of incubation in rabies and was mixing it up with the period necessary for ascertaining whether a dog is rabid after it has shown symptoms suspicious of rabies.

Under such circumstances is it to be wondered at that the disease cannot be kept under control?

Suggestions for the Control of the Disease.

At the second International Veterinary Congress, held in 1863, the Committee resolved that the introduction and strict execution of a rational supervision of dogs was the surest means of preventing and ultimately extirpating rabies.

Were a committee formed in this present year, with all the added knowledge and facts of recent years concerning the disease, it could not frame a more comprehensive resolution or one that aimed more at the root of the question.

It is this rational supervision of dogs which is required in India at the present day, and there is no reason whatever why a workable scheme should not be formulated, aiming at such supervision, and although in a country like India ultimate extirpation of the disease could not be expected owing to the fact that wild animals, and especially jackals, act as reservoirs, yet the disease could to a very large extent be suppressed and kept under control were it grappled with in the canine species only.

Before suggesting regulations which would be practicable in a country like India, I will first summarize the regulations contained in the Order of the Board of Agriculture, March 23, 1897, known as the Rabies Order of 1897, since it may be taken that the ultimate stamping out of the disease in Great Britain was due to this Order. The salient points are as follows:—

(1) Compulsory notification of a case of rabies or suspected rabies.

(2) Compulsory slaughter of dogs diseased, suspected, or of dogs bitten by a diseased or suspected dog.

(3) *Post-mortem* verification of a case of rabies.

(4) Compulsory isolation of dogs which have been exposed to infection (*i.e.*, that have been in contact with a rabid dog, whether known to have been bitten or not).

(5) Seizure, detention, and disposal of stray dogs.

(6) Disposal of the carcase of a dog affected with or suspected of rabies.

(7) Regulations as to disinfection of buildings, &c.

(8) Punishment for infringement of the Order.

The last case of rabies occurred in this country in 1902. The re-introduction of the disease has been prevented by accessory Orders dealing with the importation of dogs—viz., the Importation of Dogs Order of 1901 and the Importation of Canine Animals Order of 1909. In dealing, however, with the disease in India no such orders as the latter could be of any practical value.

The Above Regulations with Regard to their Applicability to India.

The first necessary step in India is to decrease the number of dogs and fix the responsibility for their ownership. By this means the uncontrolled roamings of ownerless pariah dogs would be reduced to a minimum. The only method by which this end can be effected is to put a tax on dogs, to insist on their being registered, and at the same time to enforce the wearing of a collar with the name of the owner engraved thereon. The practicability of this suggestion may be questioned, but in my opinion it is perfectly feasible, and even if such a law were not made universal it could be applied to certain limits to commence with—*e.g.*, to all towns of any size (including all cantonments) and to all villages and areas within a certain radius of such towns. The tax need not necessarily be a large one, and, however small it were made, it would be an enormous source of revenue to Government. It might be argued that the vast majority of native dog owners are too poor to pay such a tax. With this I disagree, and am confident that a small tax amounting, say, to a few annas a quarter would not prevent even the poorer class of native from keeping a watch-dog if he considered such to be necessary. The only effect which such a tax would have would be to prevent

natives from keeping several dogs where one would be sufficient for their needs, and such is the result aimed at. Nor in framing such an Order do I consider that it would be wise to exempt sporting dogs, since the tax would be so small as not to prejudicially affect sport, and it would be difficult to discriminate between sporting and non-sporting dogs. Natives are fond of keeping dogs of the greyhound type which they use for coursing. If such dogs were exempted the object of the taxation would be frustrated.

At the present time every native village and bazaar is swarming with pariah dogs, many ownerless, the majority half starved, mangy, and repulsive. The native is particularly averse to taking life and would not do so in the case of a dog, even knowing it to be ownerless and starving, or even perhaps suffering from some incurable disease. Dogs of this sort, including a number which have owners, are left to maintain their existence by scavenging. It might be argued that these pariah dogs are necessary from a sanitary point of view for scavenging purposes. With this I cannot agree. In any case, judging from their condition, the scavenging might be effected by a quarter their number. Moreover, there are other scavengers in the form of vultures, kites, hawks, &c., which are abundant near every human habitation.

Another necessary step in any movement for the suppression of rabies is the education of the public as to the nature of the disease, its recognition, the dangers incurred in not taking immediate action in any case of suspected rabies, &c., &c. Such education could only be effected by means of pamphlets freely distributed and notices posted on public buildings. The poorer classes of natives are mostly unable to read, and therefore would not benefit greatly by such methods; but if those classes able to read were in possession of the more important facts concerning the disease and its prevention, such knowledge would to a certain extent diffuse to the uneducated classes.

With regard to the regulations mentioned above and contained in the Rabies Order of 1897, they could very well be applied with certain modifications to India:—

(1) Notification of cases of rabies or suspected rabies must be made obligatory. This notification would have to be made to the civil authorities—*i.e.*, to a tehsildar (magistrate) or to an officer

of the C.V.D. or other authority appointed by the Deputy Commissioner of the district for the purpose. Arrangements would then have to be made for the case to be seen by a veterinary officer or veterinary assistant. As veterinary officers of the C.V.D. are so few and scattered, and are continually on tour during the cold weather, the co-operation of the veterinary officers of the A.V.C. would be necessary for the carrying out of the duties of inspectors, or the duties might be relegated to the trained staff of native veterinary assistants of the C.V.D., whose diagnosis must be accepted as final. It would then be necessary for the inspector to put in force the powers conferred by the Act. He would have to give orders *re* the slaughter and disposal of the carcase.

(2) Dogs affected with rabies would be immediately slaughtered.

In a country like India, where the disease cannot be stamped out even by the most drastic measures, the compulsory slaughter of dogs suspected of rabies or of dogs bitten by diseased or suspected dogs would not be justifiable.

In the case of dogs suspected of rabies—*i.e.*, showing suspicious clinical symptoms—these would have to be strictly segregated in an enclosed space (room, stable, &c.), securely chained so as to avoid the remotest possibility of contact with man or beast. It would be part of the duties of an inspector to approve any such place and to declare the dog free at the end of such period of segregation. In the case of dogs bitten by a diseased or suspected dog, a six months' period of segregation must be strictly enforced. This would involve the exercising of the dog on a lead, and the segregation would be similar to that enforced in the case of dogs imported into Great Britain at the present time, excepting that the dogs would be left with their owners, who would be responsible for carrying out the regulations.

I do not for a moment suggest that the segregation would in every case be carried out properly; at the same time flagrant breaches of the regulations could be punished, and the mere fact of such regulations existing would deter the majority of people from keeping such dogs owing to the trouble involved in carrying them out, and would therefore have their dogs destroyed in preference.

(3) *Post-mortem* verification must be insisted upon in all cases in which it is possible, and where it is known that the dog has bitten a human being or other dogs, a portion of its brain should in all cases be sent to the Pasteur Institute for verification.

(4) Compulsory isolation of dogs which have been in contact with a rabid dog, but are not known to have been bitten, would be quite impracticable in India.

(5) Seizure and destruction of stray dogs must be rigidly enforced.

(6 and 7) Regulations *re* the disposal of carcases of affected or suspected cases, and also *re* the disinfection of buildings, &c., would be necessary.

(8) Punishment for infringement of the Order should be rigidly enforced.

It is only by the enforcing of some such orders as the above that control of the disease can be hoped for.

Evasions of the law would, of course, be plentiful. On the other hand, news travels very fast in India, and in many cases where a rabid dog runs riot and bites other dogs, the fact of such dogs having been bitten and the names of the owners thereof is soon public property. Under such circumstances the owner would find it difficult to hush the matter up and evade the law.

Suggestions for Dealing with Canine Patients in India.

In a country like India where rabies is rampant it is as well to adopt certain precautions in one's dealings with canine patients brought for treatment. In the first place it is as well to suspect every strange dog, and it is a wise precaution never to allow any dog, whether one's own or a strange one, to lick one's bare skin. It is a common habit of lovers of animals, and of dogs in particular, to pat them, and the latter by way of showing their affection will usually attempt to lick the hand. This habit of fondling a dog which appears friendly should be avoided.

The wisdom of this advice will be seen when one remembers that the saliva of a dog becomes infective possibly several days before clinical symptoms of the disease are manifested, and infection may be brought about by a rabid dog licking an abrased surface. Moreover, it should be remembered that cases of rabies frequently crop up in which there has been no previous history of the animal having been bitten, and therefore no means by which a warning might have been given of any possible danger.

Secondly, in the case of dogs brought by attendants or their owners on leads for treatment, it is a wise precaution to first question the attendant as to the nature and history of the illness before commencing to examine the patient and not to commence the manipulation first. During such cross-examination one might elicit information leading one to suspect rabies, in which case one would be doubly on one's guard in any manipulation that might be necessary. During the manipulation of any patient, whether suspected of rabies or not, avoid as far as possible getting the hands soiled with saliva, more especially so if there happens to be abrasions on one's skin. It is also well to acquire the habit of immediately washing the hands in suitable disinfectant after manipulating the mouth of any dog.

Lastly, should the appearance of the dog or the cross-examination of the attendant lead one to strongly suspect rabies, no amount of manipulation, such as opening the patient's mouth and gazing down its throat, can help to confirm one's suspicions, and since no useful object is to be attained, handling the patient is best avoided altogether. One is not paid to run unnecessary risks, and suspicions once aroused are not easily allayed. Therefore, the safest course in such a case is to take immediate steps to have the animal segregated in the way detailed above for dogs showing symptoms suspicious of rabies. If the owner is willing it would be better to advise immediate destruction, provided the patient is not known to have bitten any other dog or human being.

A STUDY OF THE GUTTURAL POUCHES OF THE HORSE.*

By WALTER STAPLEY, M.D., M.R.C.V.S.,
Professor of Veterinary Anatomy and Surgery, Melbourne University.

A KNOWLEDGE of comparative anatomy is apt to induce the belief that many of the variations of structure existing in different species of animals is due to some form of force operating on animal tissues. An excellent example of force dominating shape is displayed in the thorax of the horse. The weight of the horse is largely carried on the sides of the ribs, from which results a lateral narrowing of the thorax and a driving backward toward the loin of the lung; consequently it becomes necessary for the

* Read before the Royal Society of Victoria.

horse to carry eighteen pairs of ribs, so that the thoracic content may be accommodated. Man's upright position has removed lateral, restricting forces from the sides of his chest; the lightness of lung tissue, unrestrained by such pressure, has caused the human lung to encroach on the neck. It is noteworthy that with ascent of the lung in the neck only twelve pairs of ribs are found, and the last or lower rib usually showing atrophic changes.

Cervical ribs are occasionally found in men and in women; they are, however, reported to be three times as common in women as in men. Whether they exist in aboriginals I do not know. The fact that the costal breathing of cultured women is said not to occur in native races leads me to think that in all probability cervical ribs are commonly found associated with atrophy of the upper limb. Surgeons have removed these neck ribs for the relief of pain. This pain is regarded to arise from stretching of the brachial plexus and the subclavian artery; it is not improbable that pain may occur during the development of these structures from an irritated pleura. From this irritated pleura arises the demand for a rib to protect the unprotected lung, and the pain arising from the same source splints the area whilst the rib accustoms the structures, into which it is thrust, to the annoyance of the invasion.

I have prefaced my remarks on the guttural pouches of horses by this reference to force operating on the chest because it sheds some sidelight on the more hidden force effects calling into existence the hernial modifications of the auditory tube of the horse. Between the lateral and median fibro-cartilaginous laminæ of the auditory tube the mucous membrane of the tube finds its exit, in sac form, into the retropharynx. Such an escape of the mucous implies an atrophy of the membranous lamina of the auditory tube. The cause of this atrophy cannot at once be seen by dissection. Searching these tissues to find the cause of this obliteration of the membranous lamina we are struck by two remarkable features in and about the throat of the horse. First the narrowness is almost as striking as the great depth of the inter-mandibular space; secondly, the stylo-hyoid bone (epihyal) reaches its highest development in the horse. Upon these two facts largely depends the development of the guttural pouches. The mucous membrane of the tube has probably been dragged out of the tube by adhesion of the stylo-hyoid bone with the membranous lamina

and through it adhesion to the mucosa and stylo-hyoid has occurred. The development of depth of the mandible caused a descent of the larynx, with which organ were carried down the stylo-hyoid bones. The mucous folds once in the retropharynx were spread to their present confines by flexion and extension of the atlo-occipital joint, &c., through adhesion of the submucosa with the surrounding structures.

Atmospheric pressure has not produced these mucous sacs. They are to be found in the fœtal foal; they are delicate sacs even in an old adult. Had they been submitted to pressure during life they should show considerable thickening. The entrance to these sacs is of sufficient size to prohibit pressure greater than atmospheric within these sacs.

The narrow and deep space through which passes the laryngo-pharynx is roofed by the base of the skull; walled by the unyielding branches of the mandible and the modified digastric muscle filling in the space between the wing of the atlas and the cervical border of the lower jaw; floored by the larynx held firmly in the fairway of inspiration so that descent of the larynx is inhibited by the stylo-hyoid bones. Thus there is no provision outside the deep tunnel through which pass the larynx and pharynx for expansion of the pharynx during swallowing, &c. This tunnel-space runs into a dome extension in the roof. Down from the auditory tube into the dome of the retropharynx these loose folds of pouches extend themselves into a space, which, to borrow an expressive surgical term, may be termed dead space—a space formed by the developed depth of the jaw. In this space, enveloped by the mucous folds and encased by the submucosa, the superior ganglion of the sympathetic, the vagus, the hypoglossal, the glosso-pharyngeal, the spinal-accessory, the mandibular branch of the fifth nerves and the internal and external carotid arteries are found. These structures would, in this position, be damaged against such bodies as the lip of the articular surface of the atlas and the stylo-hyoid bone were it not that these folds endow the nerves and vessels with the power of passive movement during either co-ordinated or erratic muscular action. So freely do these nerves move in the exquisitely delicate submucosa that some difficulty is met in dissecting the pouches owing to the elusiveness of these structures to the forceps. A very important function of these pouches is the protection of these

basal structures from injury. Without the pouches filling the dead space at the base of the skull (the retropharyngeal area) the grace of movement shown in the head and neck of the horse would be lost. They allow of free extension and flexion of the head, by the looseness of the folds with their delicate submucosa adapting themselves and their contained nerves to every movement so beautifully that nerve pressures or nerve pulls do not arise.

The air contained within these sacs probably plays some minor part in lessening the friction of movement by allowing the mucous surfaces to glide over one another with as little friction as occurs between serous surfaces. The guttural pouches represent tissues modified by force operating through the demands of speed and of food having developed depth and narrowness at the expense of breadth.

Clinical Articles.

ON MR. WALLIS HOARE'S ARTICLE ON MILK FEVER.

By R. FERGUSON STIRLING, M.R.C.V.S.
Horsley Woodhouse, Derbyshire.

I DESIRE to tender my thanks as a country practitioner to Mr. E. Wallis Hoare for the helpful article he has given to your readers—and they should include all country practitioners—on the subject of milk fever. I may state that I always turn to Mr. Hoare's article, when there is one, first of all (that is after the Editorial, of course, Mr. Editor), and I always read his writings with delight, not unmixed with awe; in short, with somewhat of the same feelings with which I listened to his jokes a few years ago as I stood trembling before him, trying in vain to remember whether the horse did or did not possess a posterior aorta, and resolving that if the question were put to me I should venture to suggest that it was a branch of the preplantars. Luckily he did not ask the question. Anyway, however much one may doubt my enjoyment of his jokes on that frosty (?) day in July, none can take from me my delight in his articles. Might I ask him, in the name of all practitioners who are struggling towards the light, to favour us a little more often than he does at present?

There is just one point I should like to raise in connection with

this subject of milk fever, but let me start at the beginning. In the few years I have been in practice I have proved to be one of the most lucky individuals in the results of my milk fever cases. I still hold to the chinosol and air treatment after the manner taught me by my good friend and excellent instructor, Mr. Dawson, of Cavan. Now, when I started in this district I questioned all the people with whom I came into contact as to the prevalence of milk fever; this in order to assure myself that there would be *some* cases I should be able to cure. I was told by the majority of the farmers that most of the neighbouring "vets." used what was either air or oxygen, and also that some of the clients were dissatisfied with the treatment, and for the reason that some of the animals died and others only partially recovered. "Partially recovered" is perhaps a "terminological inexactitude." What I mean is this, that these animals recovered from all the symptoms of milk fever but that some of them developed mammitis, and others of them went "dry"; in fact, never yielded a drop of milk after the injection—two mishaps which, if they were common, would doom any form of treatment in a district such as this is—a milk-exporting district. Now, I never have had a case of mammitis and I never have had a cow go "dry" after treatment. I found, on inquiry, that the cases in which the milk flow ceased were those in which the oxygen treatment had been adopted.

Now, in case I should ever feel tempted to try either the air or oxygen method, perhaps Mr. Hoare, or some other of your readers, could inform us whether my statements, based on hearsay evidence, are in accordance with their experience or no.

Mr. Dawson, who had a very large experience in milk fever, always held that the presence of the antiseptic did away, to a great extent, with the risk of injection, and he told me that he himself had never lost but one case of milk fever and had never had a case of mammitis resulting. I must say, however, that he was most scrupulously clean in his methods and taught his pupils and assistants to be likewise—some of my clients were amazed that, before injection, I should be so particular about the washing of the udder and teats, which, I understand, is not at all a common practice and which, to my mind, is one of those trifling essentials.

I quite realize the storm I may raise about my head by thus

"shoving in my oar" on this subject, for it is one on which the practitioner generally prides himself. Nevertheless, I hope that my effort may encourage other more able pens than mine to write a few notes from their larger experience for our information.

TUBERCULOSIS OF THE LARYNX IN A COW.

Indexed B. A. I.

By E. WALLIS HOARE, F.R.C.V.S.,
Cork.

On September 14, I was asked to prescribe for a cow said to be affected with "snoring" and an occasional cough.

The usual treatment was prescribed, viz., 2 drm. of potassium iodide, to be given twice daily, and a strong blister to be applied to the pharyngeal region. Twelve doses were sent.

On October 17 the animal was said to be slightly improved; the same treatment was continued.

On November 29, improvement slight; same treatment continued.

On December 14 I was requested to attend and examine the cow. The animal was about 8 or 9 years old, and was one of a large dairy. She was due to calve next April, and was in fair condition. When she was made to walk, she emitted a loud roaring sound, and showed marked respiratory distress. While at rest in the field the sound was considerably modified, but when in the stall it was accentuated to a marked extent and continuous. The appetite was good. There was an intermittent cough of a harsh, dry character.

Physical examination of the chest showed marked dulness of the right side up to a certain level, and there was less of respiratory sounds up to this level; above this, sounds of a wheezing character could be heard. Examination of tongue, mouth, and throat did not reveal anything abnormal.

I suggested applying the tuberculin test, but the owner did not think the animal was worth the expense, so he destroyed the cow early in January.

The steward reported "nothing wrong with the chest or lungs," but sent in the larynx which he said contained a "growth."

I forwarded the larynx to Professor Wooldridge, Royal

Veterinary College, London, who kindly examined the specimen and reported as follows:—

"I examined the interesting larynx you forwarded, and find that both vocal cords were tumefied. It was quite impossible to give an opinion as to the nature of the growths until portions were fixed and sections cut and examined microscopically, when typical tubercular histology was revealed. Sir John McFadyean kindly examined the section and confirmed the diagnosis. It would be interesting to know the distribution of the lesions in the subject."

REMARKS.

I regret that I had not an opportunity of conducting the *post-mortem*, as I feel sure that tubercular lesions must have been present in other regions of the body.

The above case is interesting from the clinical aspect, as it shows that tuberculosis, affecting the vocal cords, may be a cause of "snoring" in cattle.

Probably any other tumour in this region would produce similar symptoms.

"Snoring" in cattle is a very common symptom and it is very difficult to give a definite diagnosis in such cases. Is it due to a post-pharyngeal tumour of actinomycotic nature, or of a tubercular nature, or is it due to a tumour in the larynx?—these are some of the questions that arise.

If actinomycotic, the administration of potassium iodide generally, but not always, improves the case, and often brings about a cure.

If tubercular, this drug produces no therapeutical action.

In many of these cases, careful examination of the pharynx fails to reveal the presence of an abscess. What then is the cause of the "snoring" sound?

The tuberculin test will show a reaction if slight lesions be present in any other region of the body, and hence does not prove the pharyngeal lesion to be tubercular.

To decide the matter by administering potassium iodide is too expensive a test, and not always conclusive.

I should welcome some suggestion as to the diagnosis of these conditions. At present I must admit that I am quite "at sea" in the differential diagnosis, and consulting current text-books has only the effect of still further "boxing the compass."

HÆMATURIA DUE TO SARCOMA OF OVARY AND KIDNEY.

By E. H. STENT, M.R.C.V.S.
Manchester.

An aged brown mare, used regularly in a bread van and occasionally for saddle, had occasionally, during the last two years, attacks of hæmaturia, which soon ceased without any treatment. On this occasion, it lasting longer than usual, my advice was sought. The animal was in good condition and general health; the urine contained a large proportion of blood, which soon clotted when caught in a bucket. On examination *per rectum* I was able to feel a very large tumour in the lumbar region, so destruction was decided upon. *Post mortem* revealed a large ovarian tumour, weighing 71 lb., invading the pelvis of left kidney, and which proved on microscopical examination to be sarcomatous.

A CYSTIC CONDITION OF THE SCROTUM.

By Captain E. S. GILLETT, M.R.C.V.S.,
Army Veterinary Corps, India.

Subject.—Australian horse, five years old.

History.—This horse was landed from Australia in December, 1909, and bought as a gelding. On December 1, 1910, a swelling was noticed in his scrotum, which had all the appearance of a testicle; the swelling was only visible at certain times and was not constant.

The horse was cast and his scrotum manipulated. The swelling was found to be fluctuating and the spermatic cord could be distinctly felt and appeared normal; there was a certain amount of thickening of the external coats of the scrotum.

Diagnosis.—I thought it was probably a case of an abnormal testicle which had been retained in the inguinal canal, eventually descending into the scrotum or possibly a case of scrotal hernia.

Operation.—Having chloroformed the horse and carried out the necessary preparation of the surgical field, I made an incision in the same way as if operating on a cryptorchid. After severing the external scrotal coats, I dissected out the balloon-like mass underneath with my fingers, which was firmly connected in places to the scrotal structure, its size being roughly that of an orange.

When freed from its attachments, it was found to be firmly connected at its superior end to the spermatic cord, and manipulation disclosed the fact that the swelling contained fluid. At this stage it was certain that there was no scrotal hernia, but I still surmised it was probably a cystic testicle.

On opening the sac with a scalpel about 1½ oz. of clear, transparent fluid escaped, and on extending the incision and exposing the internal aspect of the sac, I found two cysts about the size of a pigeon's egg firmly attached to the internal lining of the sac. Further search revealed three other ruptured cysts walls from which the contents had escaped, evidently as a result of my previous manipulation. The end of the spermatic cord, which had been severed when the horse had been castrated, was normal. I removed all portions of cyst walls remaining and treated antiseptically. Recovery was uneventful.

FRACTURE OF THE ODONTOID PROCESS IN A RACEHORSE.

By NORMAN MEYERS, L.V.Sc.
Melbourne.

Current veterinary literature does not often contain reference to any break of the second cervical vertebra, implicating the odontoid process, so that a record of a specimen in the Veterinary School of the Melbourne University, which I was fortunate enough to place there, may prove of some interest.

Occurrence.—During the course of a flat race the thoroughbred in reference fell, with disastrous results to himself and rider. Death with the horse was instantaneous, no movement being noticed after he fell.

Post-mortem appearance.—On examination of the systemic vessels, the arteries were found comparatively empty, while the veins, especially those of the splanchnic area, were greatly dilated. The lungs were enlarged and filled with venous blood, but air could be pressed from all parts. Emphysematous areas, often seen in racehorses, were completely absent. The heart, though slightly larger than that of similar animals used for ordinary working purposes, was otherwise quite normal, no degenerated areas being visible. The valves were perfectly sound. As one would expect, the left heart was almost empty and quite free from

clot. The right heart contained clots, but there was no evidence of any agony clot.

Externally the break exhibited itself by a swelling in the region of the axis vertebra, and on being cut down on to it a comminuted fracture of the odontoid process was presented. Fragments of bone were found in the spinal canal and muscular tissue adjacent. Hæmorrhage and laceration of the spinal cord and meninges were apparent.

The *post mortem* was held to elicit whether the cause of death was due to the fracture of the vertebra or if death had preceded that event, but as all the presentations were compatible with those of complete inhibition of the cardiac and respiratory centres, resulting from the injury, I think no doubt will ensue as to the fracture being the immediate cause of death.

HYPERTROPHY AND DILATATION OF THE HEART.

By E. H. STENT, M.R.C.V.S.

Manchester.

An interesting case of the above recently occurred in my practice, the subject being a six-year-old chestnut cob, 14.2 hands high. It had been purchased at a fair, so its previous history was unknown. On being put into harness it would shake its head and sway across the road after travelling a few yards, so was sent to me for an opinion as to the cause.

On examination I found its temperature and the number of respirations to be normal; its pulse was weak, and corresponding heart beats remarkable, the number per minute being only eight, and these occurred in two's, with *a regular* interval of eleven seconds.

I had it under observation for a week, and this condition never varied, except that occasionally it had attacks of dizziness and would fall backwards and after a short struggle get up again. On one occasion I had counted the regular eight beats per minute when, without any excitement or warning, it commenced to beat at a rapid and regular rate (60 to the minute) for about three minutes, when suddenly it threw up its head and fell backwards. After a struggle for a couple of minutes it got up, and the rate of heart beats returned to the eight per minute.

The case being hopeless it was destroyed and a *post mortem* made. All the organs were healthy, except the heart, which weighed 16 lb., and had the usual appearance of a dilated heart: no valvular defects, lungs particularly sound.

Having no previous history, I am at a loss to account for this condition in such a healthy young horse, which was neither a hunter nor racer.

Canine and Feline Clinicale.

SOME OF THE THERAPEUTIC USES OF ACETYL-SALICYLIC ACID IN CANINE PRACTICE.

By ARTHUR PAYNE, F.R.C.V.S.
Weybridge.

Acidum acetyl-salicylicum is also known as aspirin, saletin, salacetin acetysol, and xaxa, and has the chemical formula $CH_3CO.O.C_6H_4COOH$.

It is a white powder prepared by the action of acetic anhydride on salicylic acid. Melting point, 135° C. It is soluble about 1 in 400 of water, 1 in 5 alcohol 90 per cent. It passes unchanged through the stomach, decomposing only on reaching the alkaline intestinal juices, and is incompatible with free acids, iron salts, and alkalis. It forms a clear mixture with sodium bicarbonate, and is not intended to be thus prescribed.

Medicinal uses.—This drug has marked anti-rheumatic properties and is used as a substitute for salicylic acid and its salts. It is particularly valuable as it does not irritate mucous membrane of the stomach. It is prescribed in acute and chronic affections of joints, gout, neuralgia, pleurisy, and chorea. For relieving the pain of cancer and cystitis I have found this drug most useful, and in two disorders of the nervous system which a veterinary surgeon with a canine practice often encounters. These in particular are: the paresis following distemper, and the ordinary paralysis of hindquarters, usually found in middle-aged or old dogs. The following are fairly representative cases:—

Case 1.—A sheep dog, 18 months old, property of a farmer. Treated for distemper and apparently made a recovery in about two weeks. About a week later it exhibited want of power in the hindquarters; as a farm hand aptly described it, "Looks as if

he's drunk." The symptoms developed until he could only just walk, but the slightest false step threw him down.

I commenced with 10 grains of acetyl-salicylic acid morning and evening, and this was continued for a week, with slight improvement; he then received the same dose three times daily. After two weeks of this treatment he had practically recovered; at any rate, I sent another week's supply, but the owner sent the tablets back with a message that the dog did not require them as he was all right.

CASE 2.—Sheep dog, 12 months old. Was treated at his owner's home for distemper, but upon developing lung trouble was sent to our hospital, where he suffered from the most severe attack of broncho-pneumonia I have ever seen a dog recover from—no thanks to medical treatment, as I considered the case hopeless, and left him to our man, who drenched him with milk about four times daily.

He eventually was returned home, apparently cured; but about a week or ten days later we received a message that the dog was getting very weak, and upon my visiting him found the usual symptoms of want of nervous power in the hindquarters. He was not able to get on his hind legs without help, and dragged the toes along the ground as he walked.

The first few days he received 10 grs. morning and evening, and afterwards three times daily. In ten days he was free from any symptoms of weakness in the hindquarters whatever.

CASE 3.—Dachsund, eight years old. Before I was consulted this case had been treated by an unqualified man for about three weeks. When I saw the dog her hindquarters were trailing along the ground, and urine was passed involuntarily. The history I gathered from the owner was that the bitch first showed weakness in the hindquarters, but in three or four days she was apparently completely paralyzed in both limbs.

I first prescribed 5 grs. three times daily, and when I saw her a week later there was a very slight improvement, which was only appreciated by myself and not observable to the owner. The dose was increased to 10 grs. morning and evening, and upon her visit to me the following week she was enabled, with a good deal of balancing, to stand on all four legs. At the end of another week there was a decided improvement, but my client, like the majority of ladies, was impatient and wished to consult

Professor Hobday, but I persuaded her to have a little more patience and wait another week. The bitch eventually made a complete recovery.

Case 4.—Wire-coated fox-terrier, about seven years old, the property of a working man. The history and symptoms were the same as in Case 3. After two weeks' treatment he showed a decided improvement. At this time I gave the man sufficient 10 gr. tablets to last two weeks, and told him that if the dog did not get well he was to come back and I would refund him his money, but I have not seen him since.

It is impossible to say with any degree of certainty how this drug acts.

In the case of paresis following on distemper, the drug no doubt exerts some influence on the action of the microbic toxines.

In paralysis of the hindquarters, in my opinion it owes its good effects by its antagonistic action to the deleterious substances in the nerves formed by rheumatism, or defective cell metabolism, which intercepts the impulses passing along their nervous path to the muscles.

CHYLOUS ASCITES IN THE CAT.

By Messrs. SMYTHE and SMYTHE, M.R.C.V.S.
Falmouth.

As this disease is of somewhat rare occurrence and the literature concerning it, both veterinary and medical, somewhat scanty, possibly the following clinical details of a case, which we have fortunately been able to follow to the finish, may prove of interest.

The subject was a very fine Persian male cat, about six years of age, whose sole diet for some time had been the flesh of wild rabbits, which he himself poached, preferring this diet to all other obtained for him.

He was brought to us with the history that he had always been a healthy and strong cat, but about six days previously the owner had noticed distension of the abdomen, which gradually increased and seemed to cause some discomfort when moving. Respiration was also slightly inconvenienced, but appetite was quite normal.

Upon examination the abdomen was found to be pendulous, but otherwise the cat was in far better condition than is usually the case when ascites is present.

The treatment recommended was paracentesis abdominis. This was carried out with the result that four pints of transudate were removed, macroscopically presenting the appearance of pure milk. The animal appeared to be relieved by the operation and suffered no inconvenience, the spirits and appetite not being in the least impaired.

On palpation nothing abnormal could be detected. The cat was sent home with instructions that if any renewal of the symptoms occurred it should be returned.

Upon examination of the fluid we found it of alkaline reaction and devoid of smell. It had no reaction with rennet and resisted putrefaction for some considerable time. It did not clot on standing but separated into layers, the uppermost being creamy.

When examined microscopically and compared with milk it was found to be totally different. The fat globules of the latter were absent and were replaced by innumerable fine granules (the molecular base of Gulliver), in reality particles of emulsified fat invested by an albuminous coating.

We forwarded a sample of the fluid to Professor Wooldridge for confirmation, and he agrees with us that it was chyle and has added it as a specimen to the collection in the laboratory of the Royal Veterinary College.

The cat was returned again to us exactly seven weeks after removal of the fluid, again showing some amount of abdominal distension. It was kept under observation for some days, when it was found that on a milk diet the fluid accumulated more rapidly. The animal was then re-tapped and about a pint of fluid removed, presenting exactly the same characters as on the previous occasion. It was then sent home, the subsequent treatment being directed towards maintaining the animal's strength.

For about a month afterwards it continued to do fairly well, then gradually it began to lose its appetite and condition, and at the end of two months it ceased to feed at all, becoming finally so emaciated and weak that it was advised that it should be destroyed.

Upon making a *post-mortem* examination, the body showed marked emaciation with a total absence of fat. Upon opening

the abdomen about a pint of fluid escaped, which appeared like ordinary ascitic fluid mixed with chyle. The thorax contained a small quantity of serous liquid.

The whole of the internal organs presented a contracted appearance, and involving the mesentery and mesenteric glands was a growth which, upon being cut into, was hard, and on microscopical examination proved to be carcinoma.

Therefore it is perfectly clear that the cause of the escape of chyle was due to obstruction to the flow of lymph causing either transudation of chyle through the distended lacteals or rupture of the lacteals themselves—which, we could not determine.

HÆMATURIA CAUSED BY PAPILLOMATA.

By E. H. STENT, M.R.C.V.S.
Manchester.

I was asked to make a *post mortem* upon a Great Dane dog that had been found dead one morning in a pool of blood. It had been noticed occasionally that he parted with a little blood in his urine, but little notice had been taken of it.

On *post mortem* I found the bladder was filled with clotted blood and stained serum. On the mucous membrane of the bladder were several warty growths, varying in size from a pea to a marble, and evidently it was from one or more of these the hæmorrhage had occurred. The prostate was enlarged and contained a cavity but no clot. The kidneys were cystic and fibroid, but gave no evidence of being connected with the hæmorrhage.

Abstract and Report.

VETERINARY SCIENCE IN RELATION TO AGRICULTURE.

By W. H. DALRYMPLE, M.R.C.V.S.

Department of Veterinary Science, College of Agriculture, Louisiana State University.

To those who are familiar with the advancement made in the science and art of veterinary medicine and surgery, it is very gratifying, of course, to find that sentiment is undergoing a rapid and radical change, and that our people, all over the country, are fast coming to a realization, and an appreciation, of the value and importance of the veterinary profession, not merely in relieving the sufferings and the infirmities, and in lengthening the period of usefulness of our dumb servitors, but as the conservors of so much of the wealth of the nation invested in its immense flocks and herds; and also, as the conservors of the health of our citizens, whose gastronomic taste is so largely animal as to rank second in the *per capita* amount of meat consumed per annum, on the list of civilized nations of the world.

It has ever been man's sacred duty to preserve in health, or alleviate the sufferings of, those animals indispensable to his existence for the many purposes to which they may be applied, and for which we are told they were expressly created. Looked at from this point of view, it may be said that veterinary science has been cultivated since fabulous antiquity. But although it is said to have been pursued as a science since the time of the ancient Egyptians and Greeks, it was only toward the latter half of the eighteenth century that a few illustrious names could be reckoned who were leading studies along the path of progress and extension. Probably the greatest luminary of that century was Bourgelat, who, about 1761, in Lyons, France, founded the first school. Bourgelat was an eminent lawyer and an able writer; but although learned in philosophy, and reared to the glories of the forum, he abjured the French bar, in order that he might found the school, which was subsequently patronized by royalty, and to which students flocked from every part of France, Germany, Italy, Switzerland, Denmark and Sweden.

Since the founding of the Lyons school, many similar institutions have been established throughout the civilized world. The European schools have become famous, and there is scarcely a country of continental Europe which does not have its one, or more, veterinary colleges supported by the State. England, Scotland and Ireland, too, have their veterinary schools, the Royal Veterinary College in London having been established for nearly 120 years.

Although in point of years, the veterinary profession in America may be said to hardly have doffed its swaddling clothes, yet it has a continental organization, the American Veterinary Medical Association, with a membership of over 1,000 strong, made up of members of the profession from the different States and Territories, colonial possessions and from Canada.

A number of the great universities, such as Pennsylvania, Cornell, &c., have their veterinary departments, or schools, and a great many

of the state universities and agricultural colleges are similarly equipped, and besides these there are several institutions of a more private character that stand high as teaching colleges.

To-day, the demands upon the veterinary profession are both numerous and varied. Besides the call for private practitioners, the national government is constantly seeking thoroughly equipped veterinarians to assist it in controlling and eradicating the different fatal infectious diseases to which our domestic animals are susceptible, and to guard our citizens, and those of other countries, against the dangers of an unsound and unwholesome meat supply. State and local boards of health are acquiring the services of the trained veterinarian to aid them in successfully dealing with the diseases of animals communicable to man. The agricultural colleges throughout the country are employing members of the veterinary profession to instruct their students in the science and art of veterinary hygiene. No agricultural experiment station, to-day, is considered equipped without its veterinary officer, or animal pathologist, to investigate the causes of, and the remedial measures for, the more obscure animal diseases incident to its own State; and the professional aid of the veterinarian is sought after by our national War Department to maintain, in fighting trim, its mounted arm of the service in order to successfully combat a possible foreign foe.

But apart from all this, there is no country in the world which makes any pretensions to successful agriculture, that does not have its full quota of educated veterinarians, both State and as private practitioners, because they are considered essentially necessary to the health and prosperity of the country's great live stock industry, as is the human medical profession to the health of the population. And as we have already mentioned, in conserving the wealth of the country invested in its live stock, the veterinarian is also a conserver of the health of its citizens.

What is agriculture? In the main it may be said to mean the art of raising plants and animals that are best suited for the supply of food for man, and the importance of the maintenance of the health of the live stock in this country, from an economic point of view, and which is chiefly in the hands of the qualified veterinarians to-day, may readily be appreciated when we consider that in 1908, for instance, their number in the aggregate amounted to something like 227,037,000 head.

One of the most important branches of agriculture in this country is the national bureau of animal industry, which not only conducts important investigations with the view of improving the conditions of our animal industry, but has wide powers of inspection and supervision over the health of our live stock; and this national bureau of ours employs over 800 educated members of the veterinary profession.

Coming nearer home, it may be said that the South has been one of the last sections of the country to realize and appreciate the value of veterinary science to agriculture, and for which there has, no doubt, been a reason. In the prosperous period prior to the civil war, veterinary medicine and surgery, as a science, was almost, if not wholly, unknown, and necessarily totally unappreciated in the South, the treatment of the lower animals being in the hands of the ignorant and illiterate "hoss doctor," either white or coloured, who compounded

his nostrums at certain phases of the moon, and was more anxious to ascertain under what condition of the stars the patient was born than to find out the particular condition of its excretory and secretory organs. Since the war, the South has devoted itself almost exclusively to a single-crop-system of farming, with but little or no attention paid to animal husbandry as a part of general farm practice. Outside of the work stock, which generally had to be purchased from outside, the rest of the livestock, such as cattle, sheep and hogs, have been permitted to raise themselves, and with no thought given to their maintenance or improvement. "Root hog or die," seems to have been the slogan, and in consequence, the services of the veterinarian were never once thought of, or if thought of, were considered altogether superfluous, and too expensive a luxury to try to save the life of a razor-back hog, a long-legged, bare-bellied sheep, or a slab-sided scrub steer. In fact the genus "scrub" was conspicuous in all varieties of meat animals upon the farm. Under such circumstances, it may be readily understood how the veterinarian could be looked upon as a totally superfluous individual, or a profession, apparently, without a calling. But now conditions have changed, and still are rapidly changing for the better. "Our friend the enemy," the cotton boll weevil, has impressed the all-cotton planter, at least, with the fact that a single crop of any kind does not spell successful agriculture, but that diversification, including live stock, which has built up and maintained the fertility of the soil, and brought farming up to its highest pitch in other countries, and sections of this country, is the system for him. And why should this not be so in Louisiana, for example, with her incomparably fertile soil, and her immense possibilities in the matter of live stock production especially. Just think of her rich store of valuable by-products from her cotton-oil mills, rice mills, and sugar factories; her abundance of leguminous forage crops, pasture grasses and cereals, and root crops of various kinds which produce with great luxuriance, even after the staple crops have been harvested.

In fact, there is no reasonable excuse for land remaining idle at any season of the year in Louisiana, which places her in the forefront as an ideal section for the production of live stock.

And this fact is fast being realized. Animals of the improved breeds, and of different varieties, are being imported in considerably increasing numbers, to form an important part of general farming by consuming the cheaper food products and manufacturing them into products of greater value in the shape of beef, pork, and mutton, besides producing rich manure to turn back upon the land to add humus to it, and to increase its plant food.

But, with the importation of fine animals, and with increased numbers of them, come also diseases of different kinds, which the stockman cannot successfully combat without the aid of the educated veterinarian. In that little kingdom of Great Britain and Ireland, which has been and is to-day the nursery for the pure bred live stock of the world, there are something like 3,000, or over, veterinarians—members of the Royal College of Veterinary Surgeons—to care for the health of her animals. And so it will be with us in time. The increasing numbers of our farm stock; the improvement of their quality, and their enhanced value, will tend to gradually determine the need of the intelligent advice and assistance of the educated veterinary graduate in our midst.

The veterinary profession in the South has already accomplished a good deal in behalf of agriculture, among which might be mentioned immunization against the hitherto dreaded and fatal Texas fever of cattle; and also has been largely instrumental in obtaining Federal aid for tick eradication; also the introduction of some of the important vaccines, such a anthrax or charbon vaccine, &c., to protect our animals against that fatal scourge, and several Southern members of the profession have brought about economies in the feeding of farm animals that now run up in the millions of dollars; and Louisiana has had her share, and quite a large share at that, in the various accomplishments just noted.

But further, as a matter of mutual protection, both to the live stock interests of the State as well as to itself, the veterinary profession in Louisiana has had created a State law by which no unqualified man may hereafter practise upon the farmer's animals; nor no graduate until he has passed a rigid examination before a State Board of Veterinary Medical Examiners.

And further, members of the profession in Louisiana have been largely responsible for the creation of a State live stock sanitary law to prevent, control and eradicate the contagious and infectious diseases of the farmer's live stock; to prohibit diseased animals being imported into the State from other States, and so afford protection to the live stock branch of his agricultural interests.

These are but few of the benefits which agriculture may derive, and has derived, from veterinary science. The professional veterinarian of to-day is a hygienist as well as a therapeutist. His office is to prevent, as well as to cure, disease; and it is the higher education and more thorough medical training which the modern veterinarian receives in the university, and other well-equipped veterinary schools throughout the country to-day, that makes him a most valuable citizen of the community, and an indispensable factor in the success of our great live stock interests.

Up-to-date agriculture, therefore, and modern veterinary science must go hand in hand; they are inseparable.

(*Gulf States Farmer.*)

VETERINARY WORK IN NEW ZEALAND.

In the annual report of the New Zealand Department of Agriculture for 1910, which we have just received, the section dealing with the work of the "Live Stock and Meat Division" is of especial interest to veterinarians. The director of the division is Mr. C. J. Reakes, M.R.C.V.S., whom we congratulate on having recently obtained the degree of D.V.Sc. from the University of Melbourne. The report shows the wide and varied character of the function of this important division, which comprises all matters relating to live stock generally in health and disease, the control of the quarantine of imported stock, dairy inspection, meat inspection, stock brands, the investigation of animal diseases, for which a special laboratory with a farm attached is

provided, the sterilization at the ports of shipment in India and Australia of all imported animal manures, &c. In addition to the director, the assistant director, and the senior veterinarian stationed at headquarters, there are eight supervising officers, all being qualified veterinary surgeons, whose duties include the investigation of disease, the supervision of the inspections of stock and of town dairies, the furnishing of expert advice and assistance to those officers, the immediate supervision of meat inspection (which is entirely in the hands of departmental officers), and the giving of advice and the rendering of assistance to stock-owners generally.

Although the number of qualified veterinarians employed in the division is very large, there being nearly thirty altogether, "the engagement of more veterinary officers" is considered "necessary during the coming year" in order that more time may be devoted by the staff to field work.

During the year the number of animals slaughtered for human consumption under inspection and the percentage condemned was as follows:—

	Killed	Percentage condemned	Percentage partially condemned
Cattle	216,521	2·21	2·43
Calves	12,844	1·66	0·02
Sheep	2,489,754	0·39	0·09
Lambs	3,637,595	0·06	0·07
Swine	65,153	1·92	5·44

The direct cost of this inspection to the Treasury was but £1,332, this representing the difference between the revenue received from the meat companies and abattoirs, and the gross expenditure.

The division, in addition to the large number of inspectors engaged in the examination of meat, has one of its own officers, Mr. A. Crabb, M.R.C.V.S., stationed in Great Britain, whose duty it is to inspect the meat of the Dominion on its arrival, and "his services have proved of great value to the Department," as is fully borne out by some of Mr. Crabb's communications included in the main report.

One section of the report deals with the examination of stallions for hereditary unsoundness. The system of voluntary examination, initiated in Victoria and adopted in New South Wales and other States, Mr. Reakes does not recommend should be adopted in New Zealand, where the horse-breeding industry is "so valuable an asset"; but, instead, he urges a compulsory system of examination and licensing of stallions, commencing with two-year-olds the first year, gradually extending the scope till all stallions are included up to eight-year-olds, with the provision of an insurance scheme to which the Government should be a contributor.

The necessity of the registration of veterinary surgeons and for shoeing smiths is emphasized in the report. Many other

matters of importance to the farmer, such as tuberculosis, in cattle and poultry, blackleg, contagious mastitis, abortion, facial dermatitis in sheep and cattle, &c., are discussed in the report, which is full of general interest alike to the veterinarian and to the farmer.

The investigations conducted by Mr. H. A. Reid, F.R.C.V.S., D.V.H., included in a special report, are also of great interest, and some of them we propose to reproduce in this journal.

Reviews.

A Minute on Sheep Diseases. A Minute on the Cattle Disease. By R. Willmot, F.R.C.S., Government Veterinary Surgeon, Agricultural and Stock Department, Tasmania.

Indexed B. A. I.

Two bulletins as above have been received. Each publication is copyrighted, though why such an unusual course is adopted we are at a loss to comprehend.

The two diseases of sheep dealt with are stated to be "braxy" and "louping-ill" respectively. While the report is "intended for the information of those interested in sheep rather than for the bacteriologist or scientist," it is extremely doubtful if it will on the whole be comprehended by the former, and certainly it does not carry any kind of conviction to the latter. Indeed, the phraseology is throughout such a mixture of a semi-popular, semi-scientific nature as to be at times amusing and often annoying. Several phenomena are pathognomonic according to the author: "Some hours before death the abdominal cavity commences to swell up," subcutaneously, "large patches of serous fluid which may be mistaken for blood, but which is not blood but serous fluid stained a bright scarlet colour, due to the escape of the hæmoglobin of the blood corpuscles hæmolyzed by the action of the bacteria." . . . "The fourth stomach contains a certain amount of blood-stained mucus with œdematous patches, more or less tumefaction, and maybe necrosis or gangrene, and the whole organ is stained a purplish colour from the hæmolyzed blood corpuscles." . . . "The small intestines are always empty of fæces (*sic*) and *only* contain gas, mucus, and the pathogenic bacteria." . . . "The lungs may be a little gorged with sanguineous fluid, but in no part of the body is there any evidence of inflammatory action having taken place."

After showing the "blebs or air-blisters" on the surface of the carcase after skinning, the hæmolysis of the blood causing the scarlet tinge of the œdema, the changes in the fourth stomach and the similar appearance, "but in a less degree," of the small intestines, the friable nature of the liver with "a large escape of air" (*sic*) from the cut vessels, the "rush of air" on "opening the heart," &c., to be due to invasion by the bacillus,

it is calmly observed under "Bacteriology of the disease": "From what I have already stated it will be understood that the disease is caused by a special bacillus which leads a parasitic life in the *intestines of the sheep*." Further on the bacillus is said to be found in nearly all the secretions of a sheep dead of the disease, in the liver, kidneys, and blood; but is "especially abundant in the secretion of the peritoneal and other serous cavities, and in the mucus in the small intestines and fourth stomach." The experimental evidence of the disease being true braxy is practically *nil*, although it is undoubted the description of the *post-mortem* appearances corresponds with that of Hamilton.

Experiments on other animals, even the ordinary laboratory animals, are deemed absolutely unimportant, for apparently none have been attempted. "The results of outside animal inoculations, which are most erratic (why?), are therefore not of much advantage from a diagnostic point of view." This because Dr. Willmot does "not think braxy has ever been accused of affecting animals other than sheep"—verily a new attitude for a bacteriologist to adopt, though perhaps convenient under the circumstances.

That the author has a hazy idea of the meaning of bacteriolysis is shown by the statement that "it may be possible to tell from the phagocytic index of the sheep's blood when it may be safe to drench animals," that is when the *bacteriolytic power* is greatest.

Louping-ill.—A disease identical with louping-ill in Britain is also said to exist in Tasmania, and it does not appear peculiar to Dr. Willmot that to that far-away small land, alone of all the countries to which British sheep have been exported, has this disease been conveyed, while the greater part of Britain has remained entirely free. The symptoms as described are rather suggestive of tetanus.

The *bacteriology* receives considerable attention of a kind. "The natural habitat" of the anaerobic bacillus is "the stomach and intestinal canal of the sheep." It is certainly remarkable in its variations: "Many *involution* forms present prevent an accurate description," but it is "a large rod-shaped bacillus running from 3 to 7 or 8 microns in length by about 1·5 micron in breadth; has a great tendency to spore, which may occur either in the middle or at one end, or it may after incubation assume an appearance like the tetanus bacillus." Truly protean in morphology. The bacillus is cultivated from the peritoneal fluid "which is generally free from other bacilli." (It would be difficult to decide what were "other bacilli.")

"The reproduction of the disease is a simple matter" here, and cultures do not require acetic acid apparently. Curiously though "the *post-mortem* appearance from the artificially-caused disease is different from that of the naturally-acquired disease," chiefly in that there is "a considerable amount of local disturbance and local evidence of the ravages of the bacillus." No data regarding the duration of the natural form of the disease are

given, but from three stages being described—incubative, choreic, and paralytic—one may assume a day or two.

The *Cattle disease* is boldly termed "Chorea paralytica bovis," and the pamphlet claims it to be due to the louping-ill bacillus. According to Dr. Willmot, the description given by Mr. Desmond, of South Australia, of the disease known there as "Dry Bible" corresponds to the cattle disease, especially so far as the choreic symptoms are concerned. The chief symptoms are segregation, uncertain jerky movement, especially of hind limbs, cessation of rumination, some paralysis of the neck muscles and those of mastication and deglutition, and attempts to eat but inability to swallow. Excitement at times is manifested, and there is evident "brain intoxication," followed by paralysis. "Throughout tetanic or choreic twitching of the muscles and limbs may be noticed." The symptoms alone are assumed to show "an extraordinary similarity" with those of "louping-ill" in sheep.

The discovery of the bacillus was made by incubating in pipettes the "clear," "pinkish," and "fairly free from odour" peritoneal fluid of an animal "that had been sick and lying down paralyzed for eight to ten days." It became turbid and "was found to contain the pathogenic micro-organisms, which are rod-shaped bacilli varying in size from 4 to 7 or 8 microns in length by over a micron in breadth, some sporing either in the centre or at one end." These, when compared with those of a similar preparation of louping-ill of sheep, showed "the same morphology, the same involution forms, the same evidence of sporing, the same rounded ends and the same tetanus-shaped forms in some of them," all of which is far from surprising. The same kind of bacteria were obtained from another heifer, but in this case from the stomach and intestine, which "were empty except of mucus and the pathogenic microbe." Accommodating microbe and accommodating stomach!

Although in considering prophylaxis of louping-ill (ovine and bovine) Dr. Willmot favours Hamilton's drenching with cultures, which he assumes is now generally adopted in Britain, yet he rather illogically concludes: "Probably affected cattle now continue to spread the disease exactly in the same way as the sheep do—*e.g.*, through their droppings, which contain the spores of the bacilli contaminating the pastures."

The cattle report is illustrated with reproductions of Hamilton's photomicrographs of braxy and louping-ill bacilli, and photomicrographs of the author's bacilli, and these are indeed far from being convincing. The one of Willmot's showing "drum-stick involution forms and spores" of braxy bacillus is certainly nothing like any of Hamilton's, while the louping-ill photographs might be paralleled by smears from almost any dead animal.

On the whole it is to be regretted that such work, even admittedly rather premature, has been published by a "Government veterinary surgeon," though we are pleased to observe no *veterinary* diploma or degree is claimed by the author.—T. F.

THE REGISTER OF VETERINARY SURGEONS, 1911.

"THE Register of Veterinary Surgeons" for the year is now published at the Royal College of Veterinary Surgeons, 10, Red Lion Square, and the price as usual is three shillings and sixpence. Again we welcome some new features, which include a calendar, giving dates of meeting and examinations, dates of opening of the various colleges, and deaths of famous veterinarians, both British and continental. A list of officers for the year is given, together with a completed list of winners of FitzWygram prizes and a form of bequest. The revised regulations of the Army Veterinary Corps are included, and the new regulations relating to the Territorial force and the special reserve. Another new feature is a list of veterinary societies at home and in the colonies, together with the names of their officers; and, lastly, is to be found a matter of very great importance for those concerned, namely, a list of members whose addresses are unknown. We publish the list elsewhere and direct special attention to it and the possible serious consequences of not informing the Registrar of changes of address. It is interesting to note that during the year there have been ninety-three additions to the register, while sixty-one deaths have been reported during the year. We are very glad to see that at last the telephone has been installed at 10, Red Lion Square, the number being City 1200.

Miscellaneous.

AUSTRALASIAN NOTES.

THE degree of Doctor of Veterinary Science was conferred on Mr. C. J. Reakes, M.R.C.V.S., Director of Live Stock, Wellington, New Zealand, by the University of Melbourne on December 23, 1910.

At the meeting of the Australasian Association for the Advancement of Science, held in Sydney last January, it was decided to establish a new section for veterinary science. As this resolution cannot come into force till the meeting in Hobart in 1915, it was agreed that veterinary science should have a subsection in the agricultural section during the Melbourne meeting of 1912.

Professor J. Douglas Stewart, M.R.C.V.S., Principal of the Sydney University Veterinary School, left Australia at the end of January on a visit to Great Britain and the Continent.

At the Melbourne University in December last, Licentiates in Veterinary Science were granted to Messrs. C. Andrews, L. Bull, R. Grant, G. Heslop, R. Hore, L. L. Manchester, R. F. MacIndoe, T. Philp, F. G. Robertson.

ROYAL COLLEGE OF VETERINARY SURGEONS.

THE following list is abstracted from the new Register of Veterinary Surgeons, and we wish to draw special attention to it.

ADDRESSES WANTED.

The present addresses of the under-mentioned are unknown. The statutory notices have been sent out by the Registrar, and unless an address is received during the year 1911 the names will not be included in the Register for 1912.

Name	Last Address known
Bayes, James	Late of Agriculture Department, Cape Town, South Africa.
Bird, Robert H.	Fort Collins, Colorado.
Brassington, A.	15, Mornington Road, New Cross, S.E.
Cartwright, Robert Heap	98, Gordon Road, Ealing, W.
Casewell, W. Thos.	Newport, Salop.
Clarke, Andrew	Dalserf, Lanarkshire.
Cobbledick, J. O.	Queen's Row, Clifton, Bristol.
Custance, Henry, jun.	Scotgate, Stamford, Lincolnshire.
Davies, Arthur W.	Lennox Taylor Co., Iowa, U.S.A.
Deakin, Herbert Walmsley	109, Welbeck Street, Ashton-under-Lyne, Lancashire.
Dowell, Frank W.	128, Jermyn Street, St. James, S.W.
Farrell, Captain G. H.	Hyderabad (Deccan), India.
Fetherstonhaugh, H. H.	King's Somborne, Stockbridge, Hants.
Garrett, Richard	Buenos Ayres, South America.
Hall, James W.	40, High Street, Harwick.
Jackson, A. F. S.	Johannesburg Turf Club, Johannesburg, South Africa.
Kennedy, W. R.	216, Selhurst Road, South Norwood, S.E.
MacIntyre, James	4, Laird Street, Greenock, N.B.
Mac Laren, John H.	Sweethope, Shawhill Road, Shawlands, Glasgow.
Muirhead, John T.	14, Merchiston Gardens, Edinburgh.
Scott, William	Royal Artillery, Victoria Barracks, Sydney, N.S.W.
Simpkin, F. A.	Grosvenor House, Horncliffe Road, Blackpool.
Smith, T. Assheton	171 and 172, Dhurumtollah, Calcutta.
Smith, Steven Marsh	Late Captain, A.V.C.

Personal.

HUISH—COOPER.—On March 2, at All Saints' Church, Norfolk Square, W., by the Rev. W. Boyd, M.A., Charles Henry, of "Danehurst," Champion Grove, Denmark Hill, S.E., and Red Lion Square, W.C., only son of the late William Huish, of Crewkerne, Somerset, to Ellen Louise (Nell), youngest daughter of the late William Henry Cooper, of Southsea.

Translations.

A PECULIAR CASE OF COLIC.

By Staff Veterinary Surgeon BARTHEL.

The service horse Saladin, of the 6th Battery of the 4th Regiment of Field Artillery, was under treatment from April 29 to May 20,1908, with severe colic and stoppage. During the last eight days of this period he had a varying high temperature, which on one occasion rose to over 46° C. Four weeks after the beginning of the illness, whilst emptying the rectum, a short sac was found greatly macerated and filled with dry, unformed masses of dung. Slight sweating and colicky pains of a transient character were shown during the next few months. On April 17, 1909, the horse again fell ill, had become poor in condition and dull in coat. The rectal temperature varied between 38° and 39° C., only once reaching 39·8° C.; the number of pulse-beats varied between 38 and 56; the respirations between 10 and 14. Peristalsis was almost arrested. Organic changes in the intestinal canal could not be established by rectal examinations. Appetite during the whole duration of the illness was considerably diminished. The form of the illness varied continually. On May 17, there appeared to be an improvement in the condition of the patient. In place of the apathy and listlessness Saladin took notice of his surroundings and ate well. On the morning of May 18 the form of the illness had changed much for the worse and at midday the patient died, showing violent pain.

As a cause of death, on section there was found a rupture at the stomach-like widening of the right upper portion of the colon, due to a heavy intestinal stone, as big as a man's head, weighing 2½ kilogrammes (5¾ lb.) Further, the point of the cæcum with the peritoneum on the right side was attached to the right under-surface of the colon by two firm bands of connective tissue.

The situation found on *post mortem* was no doubt due to the long retention of the sac and explained the peculiar course of the attacks of colic. The occurrence of a sac in a horse's intestines is a rare event.

(*Zeitschrift für Veterinarkunde.*)

NINETEEN INTESTINAL STONES IN A HORSE WITHOUT CAUSING COLIC.

By Staff Veterinary Surgeon KLINGBERG.

In the *Zeitschrift für Veterinarkunde* (1904, vol. 7) I published an article on intestinal concretions and stone colic. At the conclusion of this article I stated: "Almost all large intestinal stones cause colic sooner or later, generally ending fatally. That there may be exceptions is not to be denied, but these are very rare."

Herein I will relate such a case of an exception. A 9-year-old officer's horse fell and caused an incurable sprain of the left hind fetlock joint, so that he was immediately slaughtered. The horse was in a well-nourished condition and had never suffered from digestive

illness. On section, there were found nineteen intestinal stones of different sizes in the stomach-like widening of the colon. Three of the largest examples were each the size of a small fist. Five stones were the size of a hen's egg, six from a pigeon's egg to a walnut, and five as big as hazel-nuts. The surface of the stones was smooth and polished and their form round or oval. Their colour was brownish, streaked with grey. The nineteen stones lay strewn in the fæcal mass, the greater number in the neighbourhood of the under-surface of the intestinal wall. Their specific weight, appearance and surface showed that they were real intestinal stones. This was also shown by an examination of their surfaces when cut in two. The concentric layers were plainly visible. The stones consisted chiefly of phosphates and carbonates. As nucleus in one stone there was a small piece of metal the size of a pea, in another a small stone the same size.

The officer had owned the horse for three years. During this period the animal never had colic. Perhaps the reason for this was that the nineteen stones were strewn in the intestine and separated from each other by fæcal masses. If the larger stones had come together all at one place, sooner or later colic would have arisen.

(*Zeitschrift für Veterinarkunde.*)

Letters and Communications, &c.

Mr. R. F. Stirling; Professor Stapley; Professor J. T. Share Jones; Professor Gofton; Mr. E. W. Hoare; Mr. E. H. Stent; Mr. N. Meyers; Captain Gillett; Professor Leighton; Mr. A. Payne; Mr. R. H. Smythe; Mr. L. E. W. Bevan.

Books and Periodicals, &c., Received.

Meat Inspection and the Meat Industry (Leighton and Douglas, five vols.); Register of the R.C.V.S.; Board of Agriculture; Department of Agriculture for Ireland; Bureau of Animal Industry; Proceedings of the Royal Society of Medicine; Journal of the Royal Army Medical Corps; Bulletin of the Bureau of Sleeping Sickness.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably type-written—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.